

RG 1-phase solid state relays with a communications interface

Communication interface for control of solid state relay and real time monitoring



RGC..CM..N

Benefits

- Communications interface. Reduced wiring and I/O modules. Solid state relay can exchange data with the system controller via this interface.
- Reduced maintenance costs and downtime. Use of real-time data for prevention of machine stoppages during operation.
- Good quality products and low scrap rates. Real-time monitoring allows timely decisions for better machine and process management.
- Reduced efforts in troubleshooting. Distinguished faults to facilitate and reduce troubleshooting time.
- Configurable. The switching mode of the RG..CM..N can be selected to either ON/OFF switching or power control.
- Fast installation and set-up. The solid state relays on the BUS are automatically configured for fast set-up and prevention of incorrect settings.
- Compact dimensions. Slimline RG series for a minimum product width of 17.8 mm, 1x DIN, up to 37 AAC at 40°C.

Description

The RG..N solid state relays are the switching components in the NRG BUS chain.

Similar to the RG..D..N, the RG..CM..N has integrated monitoring and a communication interface to provide variables and diagnostic information in real-time. The variables that can be read out are current, voltage, frequency, power, energy consumption, load and SSR running hours. The status of each RG..CM..N is accessible. Faults are specifically indicated to facilitate troubleshooting.

With the RG..CM..N variant it is additionally possible to control the output of the solid state relay through the communication interface. Apart from ON/OFF switching, the RG..CM..N can be controlled by a % power value in Burst, Distributed or Advanced full cycle switching mode.

The RG..N cannot interface directly with the system controller (PLC) but needs to be configured in an NRG BUS chain (as explained further on). 1 NRG BUS chain can handle up to 32 RG..CM..Ns. The first RG..N in the BUS chain is connected to the NRG controller, whilst the last RG..N in the BUS chain has to be terminated with a BUS terminator provided with the NRG controller.

The RGC..N (with integrated heatsink) output ratings go up to 660 VAC, 65 A whilst the RGS..N (without heatsink) output ratings go up to 660 VAC, 90 A. Specifications are noted at 25°C unless otherwise specified.

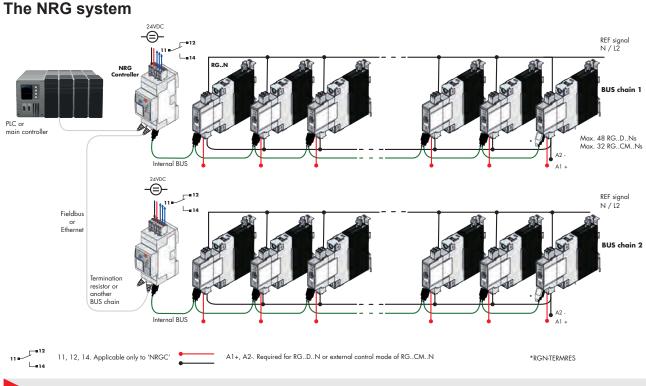
Applications

Any heating application where reliable and precise maintenance of temperatures is crucial to the quality of the end product. Typical applications include plastic machinery such as injection machines, extrusion machines and PET blow moulding machines, packaging machinery, sterilisation machinery, drying tunnels and semiconductor manufacturing equipment.

Main function

- 1-phase, AC zero cross solid state relays up to 660 VAC, 90 AAC
- Control of solid state relay through the communication interface (default) or optionally through a DC control voltage
- Selectable switching modes: ON/OFF or power control (for Burst, Distributed or Advanced full cycle modes)
- Measurements and diagnostics accessible through the communication interface





System Overview

The NRG is a system consisting of one or more BUS chains that enable communication between the field devices (such as the solid state relays) and the control devices (such as the machine controller or PLC).

Each NRG BUS chain consists of the following 3 components:

- the NRG controller
- the NRG solid state relay(s)
- the NRG internal BUS cables

The **NRG controller** is the interface to the machine controller. It acts as the master of the BUS chain when performing specific actions on the respective BUS chain, and acts as a gateway for the communication between the PLC and the RG..N solid state relays. It is not possible to operate the NRG system without the NRG controller.

The NRG controllers available are:

NRGC

The NRGC is an NRG controller with a Modbus RTU interface over RS485. The NRGC is addressed via the assigned Modbus ID (from 1-247). In an NRG system operating on Modbus it is possible to have 247 NRG BUS chains.

NRGC-PN

NRGC-PN is an NRG controller with a PROFINET communication interface. The NRGC-PN is identified by a unique MAC address which is printed on the facade of the product. The GSD file can be downloaded from www. gavazziautomation.com



System Overview - Cont.

The **NRG solid state relay** is the switching component in the NRG system. Each **RG..N** integrates a communication interface to exchange data with the machine controller (or PLC). The available RG..Ns that can be used in an NRG system are:

• RG..D..N

The RG..D..N are solid state relays for use in an NRG system having the communication interface only for real time monitoring. Control of the RG..N is done via a DC control voltage. It is possible to have maximum 48 **RG..D..Ns** in one NRG BUS chain.

• RG..CM..N

The RG..CM..N are solid state relays for use in an NRG system having the communication interface for control of the **RG..N** through the BUS and for real time monitoring. It is possible to have maximum 32 **RG..CM..Ns** in one NRG BUS chain

It is not possible to mix **RG..D.**.**N** and **RG..CM.**.**N** in the same BUS chain.

The **NRG internal BUS cables** are proprietary cables that connect the NRG controller to the first RG..N in the NRG BUS chain and respective RG..Ns on the BUS. The internal BUS terminator, provided in the same package with the NRG controller, shall be plugged to the last RG..N in the NRG BUS chain.

NRG system required components

Description	Component code	Notes
Solid state relays	RGN	NRG solid state relays
NRG controller	NRGC	 NRGC: NRG controller with Modbus communication. NRGC-PN: NRG controller with PROFINET communication. 1x RGN-TERMRES is included in the NRGC packaging. The RGN-TERMRES is to be mounted on the last RGN on the bus chain.
NRG internal BUS cables	RCRGN-xxx	Proprietary cables terminated at both ends with a micro USB connector



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RGN	



References

Order code

🛜 RG 🗖 1A60CM 🗖 🗖 EN

Enter the code entering the corresponding option instead of

Code	Option	Description	Notes	
R		Solid State Relay (RG)		
G		Solid State Relay (RG)		
	С	Version with integrated heatsink		
	S	Version without heatsink		
1		Number of poles		
Α		Switching mode: zero cross		
60		Rated voltage: 600 VAC (42-660 VAC) 50/60 Hz		
СМ		Control through the communication interface (ON/OFF or power control)		
	25	Rated current - 25 AAC	For RGConly	
	32	Rated current - 30 AAC, 37 AAC	For RGConly	
	42	Rated current - 43 AAC	For RGConly	
	62	Rated current - 65 AAC	For RGConly	
	50	Rated current - 50 AAC	For RGSonly	
	92	Rated current - 90 AAC	For RGSonly	
	K	Screw connection for power terminals		
	G	Box clamp connection for power terminals		
E		Connection configuration		
N		For integration in an NRG system		
	HT	Pre- attached thermal pad for RGS	Option	

Selection guide - versions with integrated heatsink (RGC)

			Rated operational current @ 40°C				
Rated	Rated Control	trol Connection power	25 AAC	30 AAC	37 AAC	43 AAC	65 AAC
voltage	Control		Product width				
			17.8 mm	17.8 mm	17.8 mm	35 mm	70 mm
600	via comms*	Screw	RGC1A60CM25KEN	RGC1A60CM32KEN	-	-	-
VACrms cor		Box clamp	-	-	RGC1A60CM32GEN	RGC1A60CM42GEN	RGC1A60CM62GEN

Selection guide - versions without heatsink (RGS)

		ol Connection power	Maximum rated operational current				
Rated	Rated		50 AAC	90 AAC	-	-	-
voltage	Control		Product width				
			17.8 mm	17.8 mm		-	-
600	via	Screw	RGS1A60CM50KEN	RGS1A60CM92KEN	-	-	-
VACrms	comms*	Box clamp	-	RGS1A60CM92GEN	-	-	-

* optionally DC voltage in the range 4-32 V when configured for external control

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Selection guide - versions with attached thermal pad (RGS..HT)

			Maximum rated operational current				
Rated	Control	Connection power	90 AAC	-	-	-	-
voltage	voltage		Product width				
			17.8 mm	-	-	-	-
600 VACrms	via comms*	Box clamp	RGS1A60CM92GENHT	-	-	-	-

* optionally DC voltage in the range 4-32 V when configured for external control

Carlo Gavazzi compatible components

Description	Component code	Notes	
NRG controller	NRGC	 NRGC: NRG controller with Modbus communication. NRGC-PN: NRG controller with PROFINET communication. 1x RGN-TERMRES is included in the NRGC packaging. The RGN-TERMRES is to be mounted on the last RGN on the bus chain. 	
NRG Internal BUS cables	RCRGN-010-2	10cm cable terminated at both ends with a microUSB connector. Packed x4 pcs.	
	RCRGN-075-2	75cm cable terminated at both ends with a microUSB connector. Packed x1 pc.	
	RCRGN-150-2	150cm cable terminated at both ends with a microUSB connector. Packed x1 pc.	
	RCRGN-350-2	350cm cable terminated at both ends with a microUSB connector. Packed x1 pc.	
	RCRGN-500-2	500cm cable terminated at both ends with a microUSB connector. Packed x1 pc.	
Termination resistor	RGN-TERMRES	Internal BUS chain terminator. 1 pc. is included in the NRGC packaging	
Plugs	RGMREF	Spring plug labelled 'Ref'. Packed x10 pcs. 1 pc. included in the RGN packaging	
	RGM25	Spring plug labelled 'A1 A2'. Packed x10 pcs.	
Heatsinks	RHS	Heatsinks for RGS models	
Thermal pads	RGHT	Thermal pad mounted on RGS Pack of 10 thermal pads size 34.6 x 14mm	





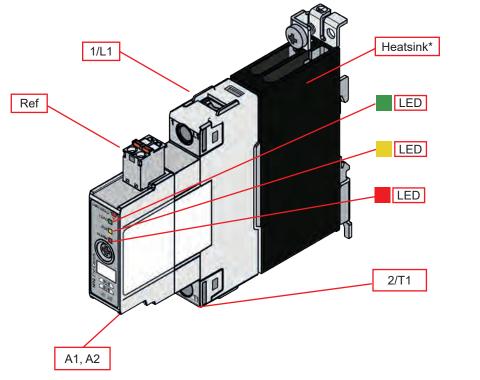
Further reading

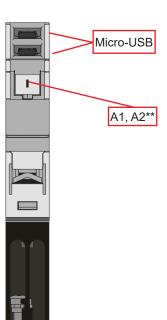
Information	Where to find it	
NRG Modbus RTU user manual	http://www.gavazziautomation.com/docs/mt_gh/SSR_UM_NRG.pdf	
NRG PROFINET user manual	http://gavazziautomation.com/docs/mt_gh/SSR_UM_NRG_PN.pdf	
Datasheet NRG Controller with Modbus RTU interface	http://www.gavazziautomation.com/docs/mt_gh/SSR_NRGC.pdf	
Datasheet NRG Controller with PROFINET inter- face	http://gavazziautomation.com/docs/mt_gh/SSR_NRGC_PN.pdf	
Datasheet RGDN solid state relay with real time monitoring via bus	http://www.gavazziautomation.com/docs/mt_gh/SSR_RG_D_N.pdf	
Online heatsink selector tool for RGS	http://gavazziautomation.com/nsc/HQ/EN/solid_state_relays	



Structure

RGC..CM..N





* integrated for RGC..N versions. RGS..N do not have an integrated heatsink ** optional

Element	Component	Function
1/L1	Power connection	Mains connection
2/T1	Power connection	Load connection
Ref	Voltage reference	Reference signal (L2 or N) for voltage measurement
IXe1	connection	2-pole plug internally shorted to allow for looping
A1, A2	Control connection	Terminal for control voltage in case of external control. RGM25 plug is
A1, A2	(optional)	required
Green LED	LOAD indicator	Indicates status of RGN output
Yellow LED	BUS indicator	Indicates ongoing communication
Red LED	ALARM indicator	Indicates presence of an alarm condition
Micro-USB Micro-USB ports for Interface for RCRGN cable connection for the		Interface for RCRGN cable connection for the internal BUS
WIICIO-03B	internal BUS	communications line
Heatsink	Intograted boatsink	Integrated for RGCN versions
neatsink	Integrated heatsink	RGSN versions do not have an integrated heatsink



Features

General	data
Concrai	uutu

Material	PA66 or PA6 (UL94 V0), RAL7035				
Wateria	850°C, 750°C/2s according to GWIT and GWFI requirements of EN 60335-1				
Mounting	DIN rail (for RGC only) or panel				
Touch Protection	IP20				
Overvoltage Category	III, 6kV (1.2/50µs) rated impulse withstand voltage				
Isolation	Input to Output: 2500 Vrms				
isolation	Input and Output to heatsink: 4000 Vrms				
	RGS50: approx. 170 g				
	RGS92: approx. 170 g				
Weight	RGC25: approx. 310 g				
	RGC32: approx. 310 g				
	RGC42: approx. 520 g				
	RGC62: approx. 1030 g				
Compatibility	NRGC (NRG controller with Modbus RS485 interface)				
Compatibility	NRGC-PN (NRG controller with PROFINET interface)				

Performance

RGS.. Output

	RGS50	RGS92	
Operational voltage range, Ue	42 - 66	60 VAC	
Switching mode	Zero cross	switching	
Max. operational current: AC-51 rating ¹	50 AAC 90 AAC		
Operational frequency range	50/6	0 Hz	
Blocking voltage	1200 Vp		
Power factor	> (0.9	
Output overvoltage protection	Integrated varist	tor across L1-T1	
Leakage current @ rated voltage	< 5 m	AAC	
Minimum operational current	300 mAAC	500 mAAC	
Maximum transient surge current (I _{TSM}), t=10 ms	600 Ap 1900 Ap		
I²t for fusing (t=10ms), minimum	1800 A ² s 18000 A ² s		
LED indication - LOAD	Green, ON when ouput is ON		
Critical dV/dt (@Tj init = 40°C)	1000 V/µs		

1. Max. rated current with suitable heatsink. Refer to RGS heatsink selection tables.





RGC.. Output

	RGC25	RGC32	RGC42	RGC62		
Operational voltage range, Ue	42 - 660 VAC					
Switching mode		Zero cross	s switching			
Max. operational current: AC-51 rating @ 25°C ²	30 AAC	30 AAC KEN 43 AAC GEN	50 AAC	75 AAC		
Max. operational current: AC-51 rating @ 40°C ²	25 AAC	30 AAC KEN 37 AAC GEN	43 AAC	65 AAC		
Operational frequency range	50/60 Hz					
Blocking voltage	1200 Vp					
Power factor	> 0.9					
Output overvoltage protection		Integrated varis	tor across L1-T1			
Leakage current @ rated voltage		< 5 n	nAAC			
Minimum operational current	300 mAAC	500 mAAC	500 mAAC	500 mAAC		
Maximum transient surge current (I _{TSM}), t=10 ms	600 Ap	1900 Ap	1900 Ap	1900 Ap		
I ² t for fusing (t=10ms), minimum	1800 A²s	18000 A ² s	18000 A²s	18000 A²s		
LED indication - LOAD	Green, ON when output is ON					
Critical dV/dt (@Tj init = 40°C)	1000 V/µs					

2. Refer to RGC current derating curves for current ratings at different surrounding temperatures.

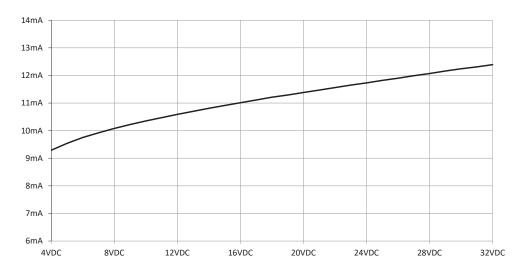
Inputs

Control voltage range, Uc: A1, A2	4-32 VDC
Pick-up voltage	3.8 VDC
Drop-out voltage	1 VDC
Maximum reverse voltage	32 VDC
Maximum response time pick-up	1/2 cycle
Response time drop-out	1/2 cycle
Input current @ 40°C	See diagram below

Note: Control voltage via A1, A2 is only required for external control switching mode. For further information on other switching modes refer to 'Switching Modes' section.



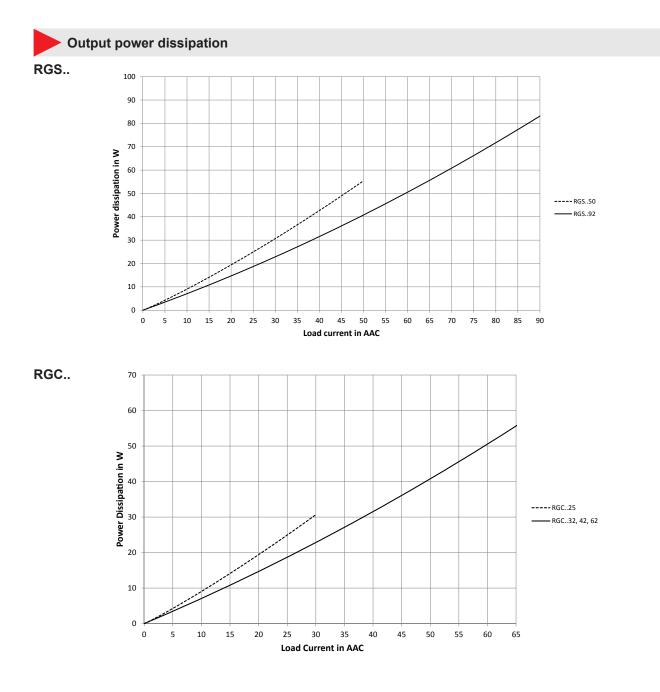
Input current vs. input voltage





Internal bus

Supply voltage	Supplied through 2 wires of the RCRGN bus cable when connected to a powered NRG controller			
BUS termination	RGN-TERMRES on last device in the bus chain			
Max. no. of RGNs in a bus chain	32			
LED indication - BUS	Yellow, ON during ongoing communication			
ID for RGNs	Automatic through Autoconfiguring (Modbus), Auto-addressing (ethernet protocols), (refer to respective User Manuals dor further details). Communication is only possible with RGNs that are configured correctly, i.e., they have a valid ID.			





RGS.. Heatsink selection

Note: The heatsink selection in tables below is valid only when a fine layer of silicon based thermal paste (with a similar thermal resistance to that specified for R_{thcs} in the Thermal data section) is utilised. The SSR will overheat if this heatsink selection is used for heatsink assemblies using a thermal interface material having a higher R_{thcs} than indicated in the Thermal data section.

	Surrounding ambient temperature [°C]					
Load current per pole AC-51 [A]	20	30	40	50	60	65
50	1.45	1.28	1.06	0.87	0.68	0.59
45	1.72	1.50	1.29	1.07	0.85	0.75
40	2.00	1.75	1.50	1.25	1.00	0.87
35	2.35	2.06	1.76	1.47	1.18	1.03
30	2.83	2.48	2.13	1.77	1.42	1.24
25	3.52	3.08	2.64	2.20	1.76	1.54
20	4.58	4.01	3.44	2.86	2.29	2.01
15	6.40	5.60	4.80	4.00	3.20	2.80
10	10.19	8.92	7.64	6.37	5.10	4.46
5		19.51	16.72	13.94	11.15	9.76

Thermal resistance [°C/W] of RGS..50

Thermal resistance [°C/W] of RGS..92

	Surrounding ambient temperature [°C]					
Load current per pole AC-51 [A]	20	30	40	50	60	65
90	0.62	0.52	0.41	0.31	0.21	0.16
81	0.77	0.66	0.54	0.42	0.31	0.25
72	0.97	0.83	0.70	0.56	0.43	0.36
63	1.23	1.07	0.91	0.75	0.59	0.51
54	1.55	1.35	1.16	0.97	0.77	0.68
45	1.93	1.69	1.45	1.21	0.97	0.85
36	2.53	2.21	1.89	1.58	1.26	1.11
27	3.55	3.11	2.66	2.22	1.77	1.55
18	5.67	4.97	4.26	3.55	2.84	2.48
9	12.46	10.90	9.34	7.79	6.23	5.45

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RGS..HT Heatsink selection for variants with pre-attached thermal pad

Note: The heatsink selection in tables below is valid for the models having a pre-attached thermal interface (RGS..HT). The thermal resistance R_{thos_HT} of the interface used is noted in the Thermal data section (ref. RGHT). In case of replacements, a thermal interface pad having the same or lower thermal resistance shall be utilised to prevent SSR from overheating.

	Surrounding ambient temperature [°C]					
Load current per pole AC-51 [A]	20	30	40	50	60	65
50	0.84	0.65	0.46	0.27	0.08	
45	1.12	0.90	0.69	0.47	0.25	0.15
40	1.47	1.22	0.97	0.72	0.47	0.35
35	1.94	1.64	1.35	1.06	0.76	0.62
30	2.57	2.22	1.86	1.51	1.15	0.98
25	3.48	3.03	2.59	2.15	1.71	1.49
20	4.58	4.01	3.44	2.86	2.29	2.01
15	6.40	5.60	4.80	4.00	3.20	2.80
10	10.19	8.92	7.64	6.37	5.10	4.46
5		19.51	16.72	13.94	11.15	9.76

Thermal resistance [°C/W] of RGS..50..HT

Thermal resistance [°C/W] of RGS..92..HT

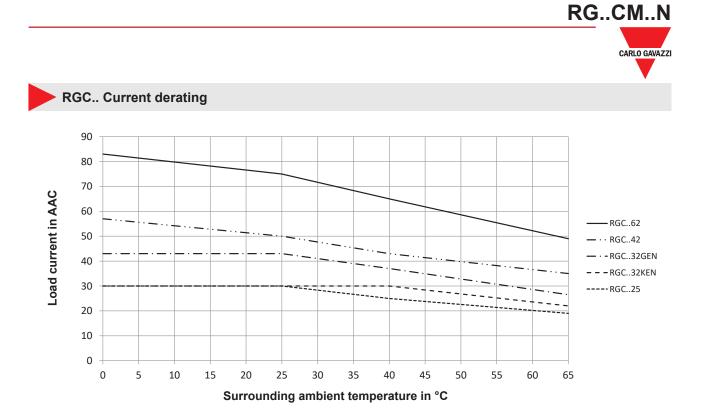
	Surrounding ambient temperature [°C]					
Load current per pole AC-51 [A]	20	30	40	50	60	65
90	0.07					
81	0.22	0.11				
72	0.42	0.28	0.15	0.01		
63	0.68	0.52	0.35	0.20	0.04	
54	1.03	0.84	0.65	0.45	0.26	0.16
45	1.54	1.30	1.05	0.81	0.57	0.45
36	2.32	2.00	1.69	1.37	1.05	0.90
27	3.55	3.11	2.66	2.22	1.77	1.55
18	5.67	4.97	4.26	3.55	2.84	2.48
9	12.46	10.90	9.34	7.79	6.23	5.45

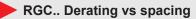


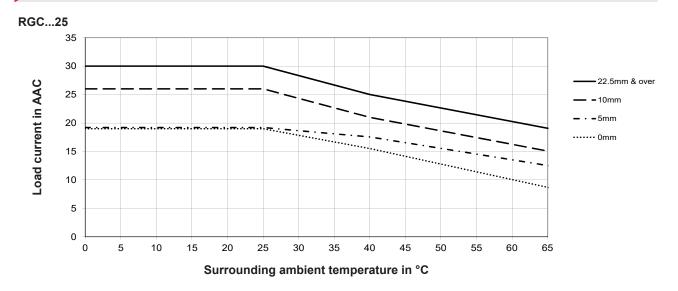
RGS Thermal data					
	RGS50	RGS92			
Max. junction temperature	125	5°C			
Heatsink temperature	100°C				
Junction to case thermal resistance, R _{thjc}	< 0.30°C/W	< 0.20°C/W			
Case to heatsink thermal resistance, R _{thes} ³	< 0.25°C/W				
Case to heatsink thermal resistance (RGSHT), R _{thcs_HT} ⁴	< 0.85 °C/W	< 0.80 °C/W			

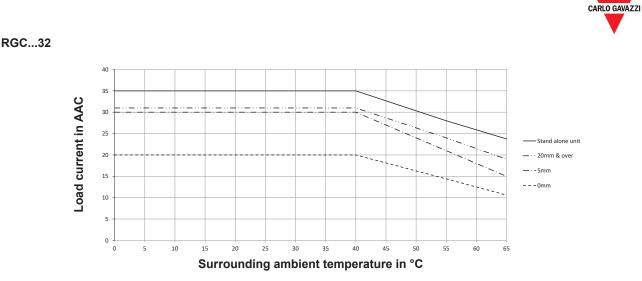
3. Thermal resistance case to heatsink values are applicable upon application of a fine layer of silicon based thermal paste HTS02S from Electrolube between SSR and heatsink.

4. Thermal resistance case to heatsink values for RGS..HT are applicable for the RGHT thermal pad that is pre-attached from the factory to the RGS.

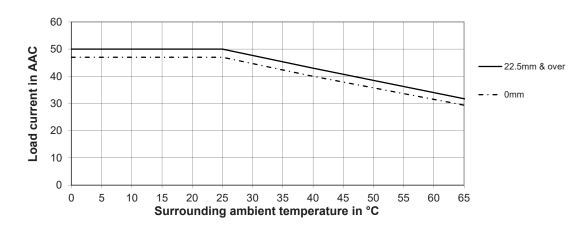




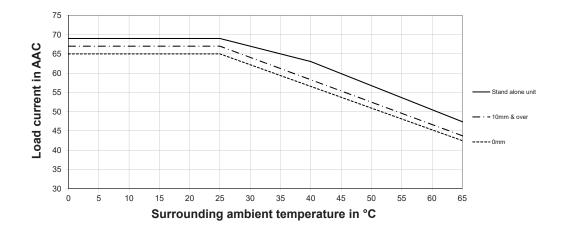




RGC...42



RGC...62





Compatibility and conformance

Approvala			
Approvals			
Standards compliance	LVD: EN 60947-4-3 EMCD: EN 60947-4-3 UL: UL508, E172877, NMFT cUL: C22.2 No. 14-18, E172877, NMFT7 UR: UL508, E172877, NMFT2 cUR: C22.2 No. 14-18, E172877, NMFT8		
UL short circuit current rating	100k Arms (refer to short circuit protection section, Type 1 – UL508)		

Electromagnetic compatibility (E	Electromagnetic compatibility (EMC) - Immunity				
Electrostatic discharge (ESD)	EN/IEC 61000-4-2 8 kV air discharge, 4 kV contact (PC1)				
Radiated radio frequency ³	EN/IEC 61000-4-3 10 V/m, from 80 MHz to 1 GHz (PC1) 10 V/m, from 1.4 to 2 GHz (PC1) 3 V/m, from 2 to 2.7 GHz (PC1)				
Electrical fast transient (burst)	EN/IEC 61000-4-4 Output: 2 kV, 5 kHz & 100 kHz (PC1) Input, BUS: 1 kV, 5 kHz & 100 kHz (PC1)				
Conducted radio frequency ³	EN/IEC 61000-4-6 10 V/m, from 0.15 to 80 MHz (PC1)				
Electrical surge	EN/IEC 61000-4-5 Output, line to line: 1 kV (PC2) Output, line to earth: 2 kV (PC2) BUS (Supply), line to line: 500 V (PC2) BUS (Supply), line to earth: 500 V (PC2) BUS (Data), A1-A2, line to earth: 1 kV (PC2) ⁴				
Voltage dips	EN/IEC 61000-4-11 0% for 0.5, 1 cycle (PC2) 40% for 10 cycles (PC2) 70% for 25 cycles (PC2) 80% for 250 cycles (PC2)				
Voltage interruptions	EN/IEC 61000-4-11 0% for 5000ms (PC2)				

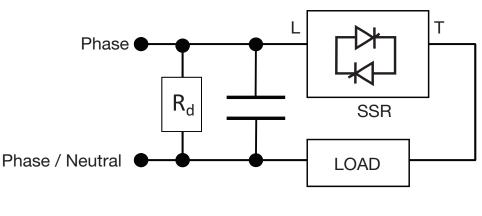
5. Under the influence of RF, a reading error of ± 10% was allowed for load currents > 500 mA and ± 20% for load currents < 500 mA. These tolerances are not maintained if Ref signal is not connected.

6. Not applicable to shielded cables < 10 m. Additional suppression on data lines may be required if shielded cables are not used.

Electromagnetic compatibility (EMC) - Emissions				
Radio interference field emis- sion (radiated)				
Radio interference voltage emissions (conducted)	EN/IEC 55011 Class A: from 0.15 to 30 MHz (External filter may be required - refer to Filtering section)			



Filter connection diagram



 $R_{d} = 1M\Omega, 0.5W$

Filtering

Part number	Suggested filter for EN 55011 Class A compliance	Maximum heater current [AAC]
RGS50	330 nF / 760 V / X1	30 A
RGS92	220 nF / 760 V / X1	30 A
RGC25	220 nF / 760 V / X1	30 A
RGC32	330 nF / 760 V / X1	40 A
RGC42 , RGC62	330 nF / 760 V / X1	40 A
	680 nF / 760 V / X1	65 A

Note:

- Control input lines must be installed together to maintain products' susceptability to Radio Frequency interference.
- Use of AC solid state relays may, according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where the user must meet E.M.C requirements. The capacitor values given inside the filtering specification tables should be taken only as indications, the filter attenuation will depend on the final application.
- Performance Criteria 1 (PC1): No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2 (PC2): During the test, degradation of performance or partial loss of function is allowed. However when the test is complete the product should return operating as intended by itself.
- Performance Criteria 3 (PC3): Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.



Environmental specifica	Environmental specifications				
Operating temperature	-20 to +65 °C (-4 to +149 °F)				
Storage temperature	-20 to +65 °C (-4 to +149 °F)				
Relative humidity	95% non-condensing @ 40°C				
Pollution degree	2				
Installation altitude	0-1000m Above 1000m derate linearly by 1% of FLC per 100m up to a maximum 2000m				
Vibration resistance	2g/ axis (2-100Hz, IEC60068-2-6, EN 50155)				
Impact resistance	15/11 g/ms (EN 50155)				
EU RoHS compliant	Yes				
China RoHS	25				

The declaration in this section is prepared in compliance with People's Republic of China Electronic Industry Standard SJ/ T11364-2014: Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products.

	Toxic or Harardous Substances and Elements							
Part Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominat- ed biphenyls (PBB)	Polybromi- nated diphenyl ethers (PBDE)		
Power Unit Assembly	х	0	0	0	0	0		

O: Indicates that said hazardous substance contained in homogeneous materials for this part are below the limit requirement of GB/T 26572.

X: Indicates that said hazardous substance contained in one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

这份申明根据中华人民共和国电子工业标准 SJ/T11364-2014:标注在电子电气产品中限定使用的有害物质

	有毒或有害物质与元素						
零件名称	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴化联苯 (PBB)	多溴联苯醚 (PBDE)	
功率单元	x 0 0 0 0 0					0	
O:此零件所有材料中含有的该有害物低于GB/T 26572的限定。							
X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。							



Switching modes

ON-OFF Mode

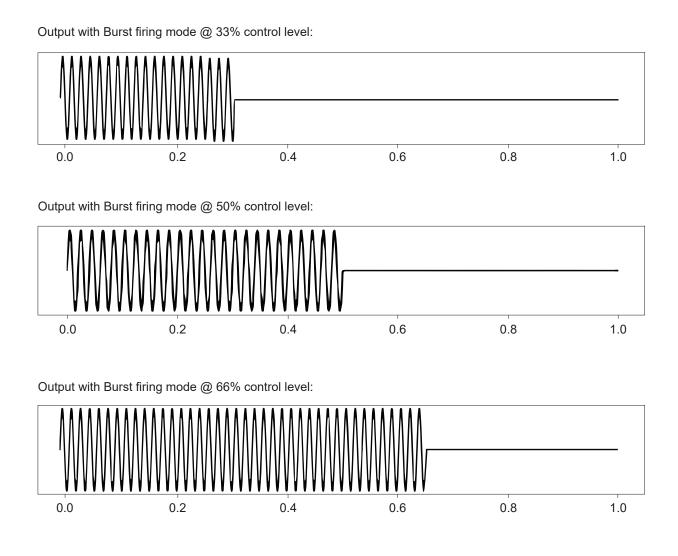
The ON-OFF mode controls the solid state relays at the user's command. All the RG..Ns on the bus chain can be controlled at the same time.

The advantages of this mode are:

- It is effectively a direct replacement of the A1-A2, i.e. for existing systems, the control algorithm within the PLC can be left relatively untouched and the output is redirected via the communication interface instead of the PLC output modules.
- One command can set the state of the whole bus chain.

Burst Firing Mode

The Burst firing mode works with a control level and a time-base which can be varied by user from 0.1 seconds to 10 seconds. The percentage ON time is then determined by the control level. Therefore, with a control level of 10% ;10% of the time-base will be ON and 90% will be OFF. The figure below shows example waveforms of this firing mode at different control levels. In this example the time base was set to 1 second. The percentage control resolution depends on the timebase set by the user. To achieve a 1% resolution, the time base has to be a minimum of 2 sec for 50 Hz and 1.7 sec for 60 Hz.





Switching modes (Continued)

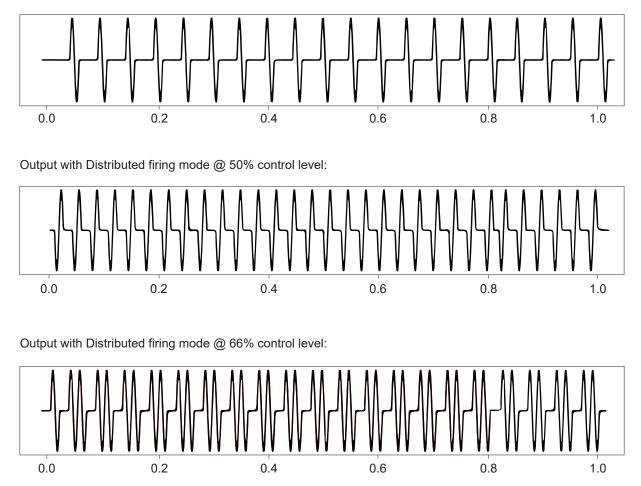
Distributed Firing Mode

The Distributed firing mode works with a control level and a fixed time-base of 100 full cycles (2 seconds for 50 Hz). This mode operates with full cycles and it distributes the ON cycles as evenly as possible over the time base. In this mode, since the resolution is 1% and the time base is of 100 full cycles, the control level is equal to the number of full cycles over the whole time base.

1% = 1 full cycle every 100 cycles

2% = 2 full cycles every 100 cycles = 1 full cycle every 50 cycles

Output with Distributed firing mode @ 33% control level:



The advantage of Distributed over Burst is the reduction in thermal cycling. On the other hand, Distributed suffers from worse harmonics/emissions than Burst.



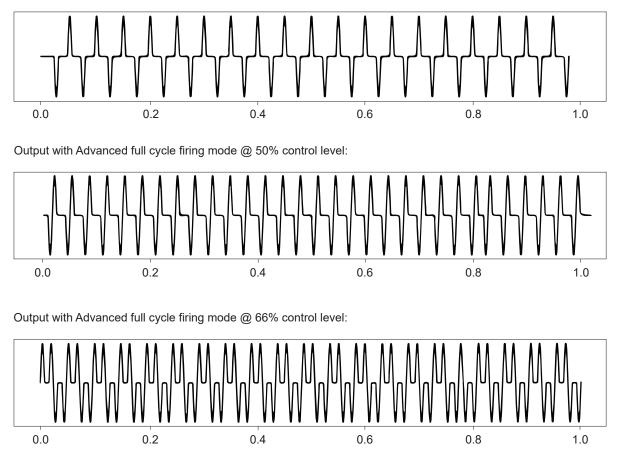
Switching modes (Continued)

Advanced Full Cycle Firing

Advanced Full Cycle (AFC) firing works on the same concept as Distributed but rather than distributing full cycles, half cycles are distributed. This mode also works over a time base of 100 full cycles (200 half cycles). In this mode, since the resolution is 1% and the time base is of 100 full cycles, the control level is equal to the number of full cycles over the whole time base.

1% = 2 half cycles every 200 half cycles = 1 half cycle every 100 half cycles 2% = 4 half cycles every 200 half cycles = 1 half cycle every 50 half cycles

Output with Advanced full cycle firing mode @ 33% control level:



The advantage of AFC over Burst is the reduction in thermal cycling. Another advantage of AFC is that visual flicker is less noticeable than Distributed thus making it suitable for shortwave infrared heater applications.

AFC has the disadvantage of worse harmonics/emissions than Burst and also slightly worse than Distributed.



Measurements

Parameter	Description
Current	This reports the measured load RMS current.
Hold current	This reports the highest RMS value of current recorded over a number of (past) cycles. The number of past cycles is configurable.
Voltage	RMS voltage reading (L1-Ref voltage) that is the supply voltage across the SSR + load (Ref signal connection is required)
Frequency	This reports the measured line frequency.
Apparent power	This reports the apparent power that is a multiplication of the voltage RMS value and current RMS value. (Ref signal connection is required)
Real power	This reports the real power reading that is based on the instantaneous voltage & current multiplications. (Ref signal connection is required)
SSR Running hours	This is a count of the time during which the SSR output is ON. On switch ON, this parameter reports the recorded value at the last switch OFF.
Load Running hours	This is a count of the time during which the output of SSR is ON. On switch ON, this parameter reports the last value before switch OFF. This measurement can be modified in case of a load or SSR replacement.
Energy Consumption	This reports the energy reading in kWh. On switch ON, this parameter reports the recorded value at the last switch OFF. (Ref signal connection is required)

Note 1: For further information please refer to the 'NRG Modbus user manual' / 'NRG PROFINET user manual'. Note 2: Ref signal connection is recommended with loads less than 1A

LED indicators

LOAD		The Load LED reflects the status of the load depending on the presence of the control signal. During an over-temperature condition, the LOAD LED will behave according to the indications in the table "LOAD LED indications in over-temperature condition" below			
BUS	Yellow	ON: OFF:	During a response from the RGN to the NRGC Communication between the NRGC and RGNs is idle or during the transmission of a command from the NRGC to the RGN		
ALARM	Red	ON: OFF:	Fully ON or flashing when alarm condition is present. Refer to Alarm Management section No alarm condition		

LOAD LED indications in over-temperature condition

Control signal	RGN supply (through internal bus by RCRGN)	Over-temperature condition	LOAD LED green
ON	OFF	Detection not possible without BUS connected	ON ⁷ OFF ⁸
ON	ON	OFF	ON
ON	ON	ON	OFF
OFF	OFF	Detection not possible without BUS connected	OFF
OFF	ON	ON OFF	
OFF	ON	OFF	OFF

7. If control signal is via A1-A2

8. If control signal is via BUS



	Alarm	management
--	-------	------------

Alarm condition		te of the Red LED of the respective RGN is ON with a specific flashing rate ns are accessible via the communication interface.				
present		er information refer to the respective NRG user manual for each communication protocol.				
Alarm types	No. of flashes	Description of fault				
	100% ON	 Over-temperature: The RGN is operating outside its operating range causing the junction to overheat The output of the RGN is switched OFF (irrespective of the control presence) to prevent damage to the RGN The alarm is restored automatically after the cooling-off period 				
	1	Load deviation: Load deviation is activated if the values of the Voltage Reference and Current Reference are > 0 either through a 'TEACH' command or updated manually. This alarm is issued if a change in current > than the Percentage Deviation is detected. This alarm is issued only if a change in current is irrespective of a change in voltage. For further information refer to the respective NRG user manual for each communication protocol.				
	2	Mains loss: Voltage and current signals are absent. The cause is a mains loss (with REF terminal connected). Without 'REF' terminal this alarm will indicate a mains loss or a load loss.				
	Load loss / SSR open circuit: 3 Load is not switching ON when control signal is present. The cause is either a load los RGN open circuit condition					
	4 SSR short circuit: Current flowing through the RGN output in the absence of a control signal					
	5	 Frequency Out of Range: The RGN is operated outside the range set by the Over Frequency and Under Frequency Limit settings. Default range is 44 – 66 Hz The RGN will not stop operating if the frequency measured is out of the set range. The alarm is restored automatically when the frequency is back within the expected range 				
	6	 Current Out of Range: The RGN is operated outside the range set by the Over Current and Under Current Limit settings. Default range is 0 – max. rating of the respective RGN The RGN will not stop operating if the current measured is out of the set range. The alarm is restored automatically when the current is back within the expected range 				
	 Voltage Out of Range: The RGN is operated outside the range set by the Over Voltage and Under Voltage. Default range is 0 – 660 V The RGN will not stop operating if the voltage measured is out of the set range is restored automatically when the voltage is back within the expected range 					
	8	Communication error (BUS): An error in the communication link (internal bus) between the NRGC and RGNs				
	9	Internal error: Bus supply out of range, hardware damage or detection of abnormal conditions				
Flashing rate	0.5 →	s $\leftarrow 3s$				



Short circuit protection

Protection Co-ordination, Type 1 vs Type 2:

Type 1 protection implies that after a short circuit, the device under test will no longer be in a functioning state. In Type 2 co-ordination the device under test will still be functional after the short circuit. In both cases, however the short circuit has to be interrupted. The fuse between enclosure and supply shall not open. The door or cover of the enclosure shall not be blown open. There shall be no damage to conductors or terminals and the conductors shall not separate from terminals. there shall be no breakage or cracking of insulating bases to the extent that the integrity of the mounting of live parts is impaired. Discharge of parts or any risk of fire shall not occur.

The product variants listed in the table hereunder are suitable for use on a circuit capable of delivering not more than 100,000 Arms Symmetrical Amperes, 600 Volts maximum when protected by fuses. Tests at 100,000 A were performed with Class J fuses, fast acting; please refer to the table below for maximum allowed ampere rating of the fuse. Use fuses only.

Tests with Class J fuses are representative of Class CC fuses.

Protection co-ordination Type 1 according to UL 508					
Part No.	Prospective short circuit current [kArms]	Max fuse size [A]	Class	Voltage [VAC]	
RGS50, RGC25	100	30	J or CC	max. 600	
RGS92, RGC32, RGC42, RGC62	100	80	J	max. 600	

Protection	Protection co-ordination Type 2 with semiconductor fuses						
Part No.	Prospective	Mersen (F	erraz Shawmut)	Siba		Voltage [VAC]	
	short circuit current [kArms]	Max fuse size [A]	Part number	Max fuse size [A]	Part number		
RGC25	10	40	6.9xx CP GRC 22x58 /40	32	50 142 06.32	max. 600	
	100	40	6.9xx CP GRC 22x58 /40	32	50 142 06.32	max. 600	
RGC32	10	63	6.9xx CP URC 14x51 /63	80	50 194 20.80	max. 600	
RGC42	10	70	A70QS70-4	80	50 194 20.80	max. 600	
	100	63	6.9xx CP URC 14x51 /63	80	50 194 20.80	max. 600	
	100	70	A70QS70-4	80	50 194 20.80	max. 600	
RGC62	10	100	6.9xx CP GRC 22x58 /100	100	50 194 20.100	max. 600	
	10	100	A70QS100-4	100	50 194 20.100	max. 600	
	100	100	6.621 CP URGD 27x60 /100	100	50 194 20.100	max. 600	
	100	100	A70QS100-4	100	50 194 20.100	max. 600	
RGS50	10	80	6.621 CP URQ 27x60 /80	50	50 142 06.50	max. 660	
	10	70	A70QS70-4	50	50 142 06.50	max. 660	
	100	80	6.621 CP URQ 27x60 /80	50	50 142 06.50	max. 660	
	100	70	A70QS70-4	50	50 142 06.50	max. 660	
RGS92	10	125	6.621 CP URD 22x58 /125	125	50 194 20.125	max. 660	
	10	125	A70QS125-4	125	50 194 20.125	max. 660	
	100	125	6.621 CP URD 22x58 /125	125	50 194 20.125	max. 660	
	100	125	A70QS125-4	125	50 194 20.125	max. 660	



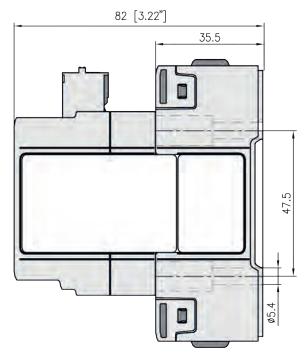
Protection co-ordina	ation Type 2 with Minatu	re Circuit Breakers (M.	C.B.s)	
Solid State Relay type	ABB Model no. for Z - type M. C. B. (rated current)	ABB Model no. for B - type M. C. B. (rated current)	Wire cross sectional area [mm ²]	Minimum length of Cu wire conductor [m] ⁹
RGS50, RGC25 (1800 A²s)	1-pole S201 - Z10 (10 A)	S201-B4 (4 A)	1.0 1.5 2.5	7.6 11.4 19.0
	S201 - Z16 (16 A)	S201-B6 (6 A)	1.0 1.5 2.5 4.0	5.2 7.8 13.0 20.8
	S201 - Z20 (20 A)	S201-B10 (10 A)	1.5 2.5	12.6 21.0
	S201 - Z25 (25 A)	S201-B13 (13 A)	2.5 4.0	25.0 40.0
	2-pole S202 - Z25 (25 A)	S202-B13 (13 A)	2.5 4.0	19.0 30.4
RGS92, RGC32, RGC42, RGC62 (18000 A ² s)	1-pole S201 - Z32 (32 A)	S201-B16 (16 A)	2.5 4.0 6.0	3.0 4.8 7.2
	S201 - Z50 (50 A)	S201-B25 (25 A)	4.0 6.0 10.0 16.0	4.8 7.2 12.0 19.2
	S201 - Z63 (63 A)	S201-B32 (32 A)	6.0 10.0 16.0	7.2 12.0 19.2

9. Between MCB and Load (including return path which goes back to the mains)

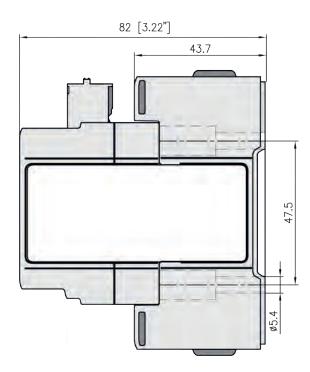
Note: A prospective current of 6 kA and a 230 / 400 V power supply is assumed for the above suggested specifications. For cables with different cross section than those mentioned above please consult Carlo Gavazzi's Technical Support Group.

Dimensions

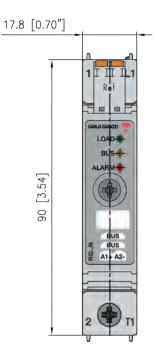
RGS...KEN

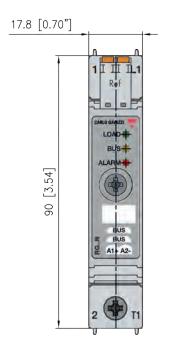






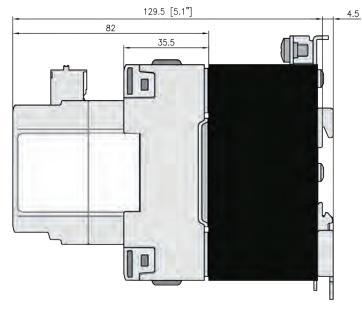
Housing width tolerance +0.5mm, -0mm as per DIN 43880. All other tolerances +/- 0.5mm. Dimensions in mm.

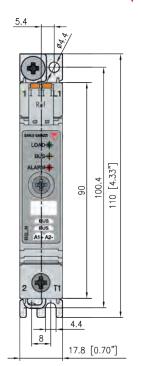




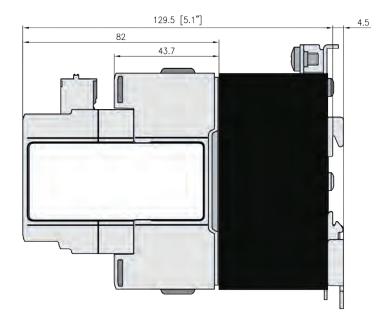


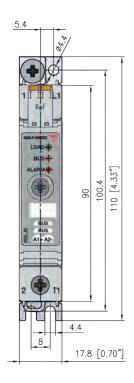
RGC...25KEN, RGC...32KEN





RGC...32GEN

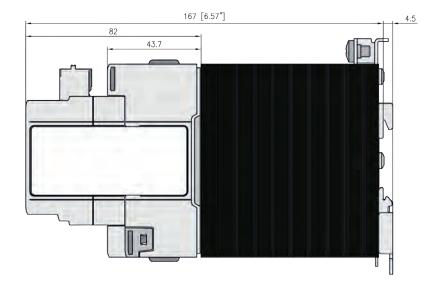


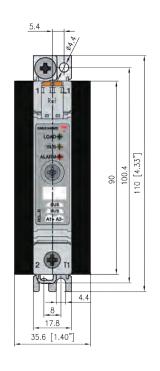


Housing width tolerance +0.5mm, -0mm as per DIN 43880. All other tolerances +/- 0.5mm. Dimensions in mm.

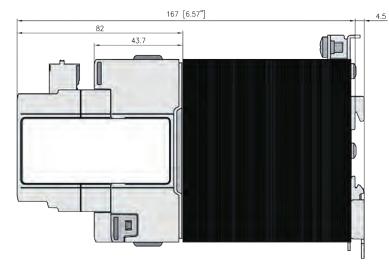


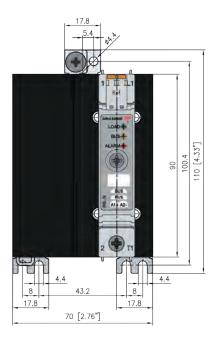
RGC...42GEN



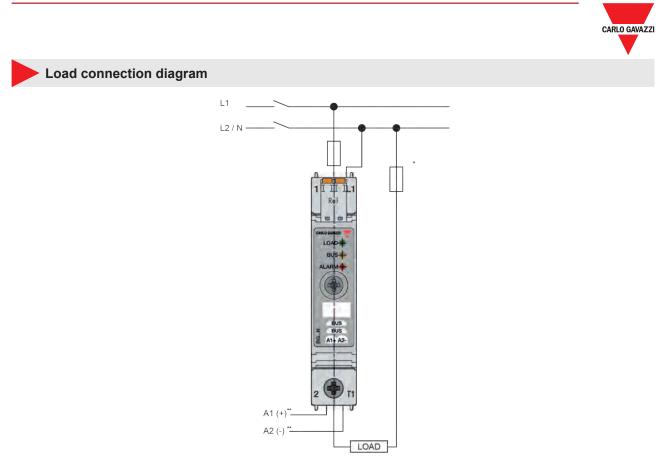


RGC...62GEN

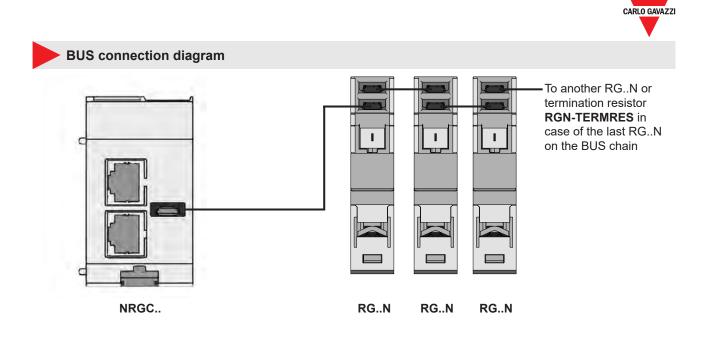




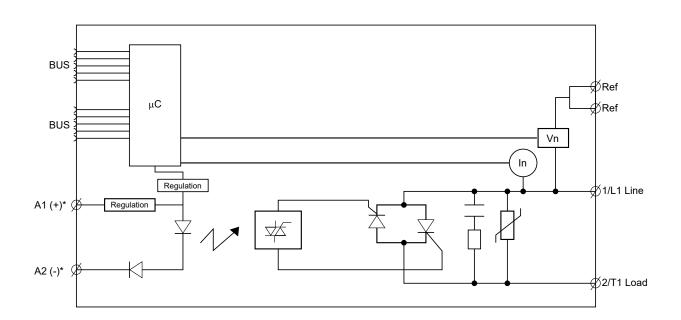
Housing width tolerance +0.5mm, -0mm as per DIN 43880. All other tolerances +/- 0.5mm. Dimensions in mm.



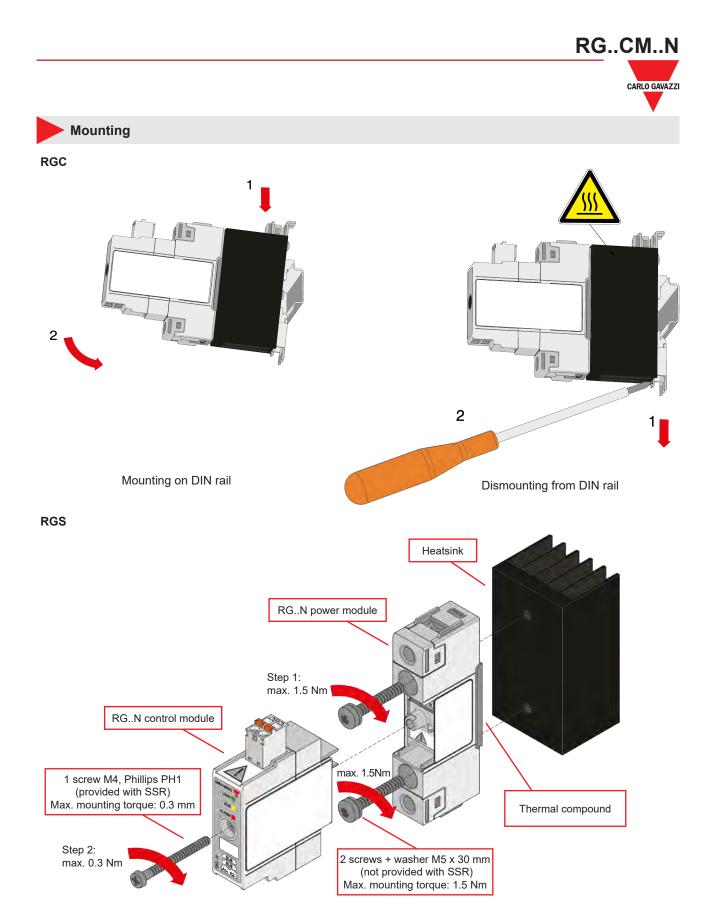
*depends on system requirements **applies only for external control. Terminal plug not provided



Functional diagram



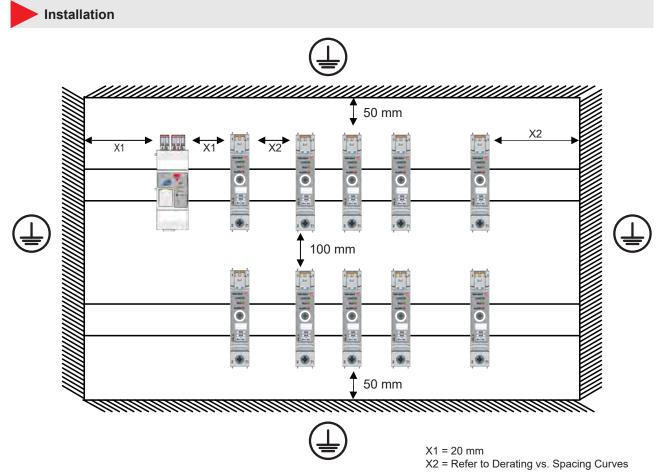
*applies only for external control



Step 1: Mount RG..N power module to Heatsink Step 2: Mount RG..N control module on RG..N power module

Make sure that the sin code marked on the control unit matches the sin code of the power unit before mounting







Connection specifications

Power connection					
Terminal	1/L1, 2/T1				
Conductors	Use 75°C copper (Cu) conductors				
	RGKEN		RGGEN		
Stripping length	12mm		11mm		
Connection type	M4 screw with captivated washer		M5 screw with box clamp		
Rigid (solid & stranded) UL/CSA rated data	2x 2.5 – 6.0 mm² 2x 14 – 10 AWG	1x 2.5 – 6.0 mm² 1x 14 – 10 AWG	1x 2.5 – 25.0 mm² 1x 14 – 3 AWG		
Flexible with end sleeve	2x 1.0 – 2.5 mm ² 2x 2.5 – 4.0 mm ² 2x 18 – 14 AWG 2x 14 – 12 AWG	1x 1.0 – 4.0 mm² 1x 18 – 12 AWG	1x 2.5 – 16.0 mm² 1x 14 – 6 AWG		
Flexible without end sleeve	2x 1.0 – 2.5 mm ² 2x 2.5 – 6.0 mm ² 2x 18 – 14 AWG 2x 14 – 10 AWG	1x 1.0 – 6.0 mm² 1x 18 –10 AWG	1x 4.0 – 25.0 mm² 1x 12 –3 AWG		
Torque specifications	Posidrive bit 2 UL: 2.0 Nm (17.7 lb-in) IEC: 1.5 – 2.0 Nm (13.3 – 17.7 lb-in)		Posidrive bit 2 UL: 2.5 Nm (22 lb-in) IEC: 2.5 – 3.0 Nm (22 – 26.6 lb-in)		
Aperture for termination lug (fork or ring)	12.3 mm		n/a		
Protective Earth (PE) connection	M5, 1.5 Nm (13.3 lb-in) M5 PE screw is not provided with the solid state relay. PE connection is required when product is intended to be used in Class 1 applications according to EN/IEC 61140				



Control & Ref connection			
Terminals	Ref (x2 poles internally shorted on RGN) A1+, A2- (RGM25 plug not provided) Image: state st		
Conductors			
Conductors	Use 60/75°C copper (Cu) conductors		
Stripping length	11 – 12 mm		
Connection type	Spring plug, pitch 5.08 mm		
Rigid (solid & stranded) UL/CSA rated data	0.2 – 2.5 mm², 26 – 12 AWG		
Flexible with end sleeve	0.25 – 2.5 mm ²		
Flexible without end sleeve	0.25 – 2.5 mm ²		
Flexible with end sleeve using TWIN ferrules	0.5 – 1.0 mm ²		
Ref internal short current handling capability	< 2 AAC		

BUS connection				
	BUS (x2)			
Terminal	BUS BUS BUS			
Туре	RCRGN-xxx (where xxx refers to the length in cm) 5-way terminated with micro USB connector Cable lengths available: 10cm RCRGN-010-2 75cm RCRGN-075-2 150cm RCRGN-150-2 350cm RCRGN-350-2 500cm RCRGN-500-2			
Conductors	+24 V, GND, Data, Data, Autoconfigure line			

RCRGN..



NRG internal BUS cable



Main features

- Cables available at various lengths to provide the internal BUS of the NRG system
- Cables terminated at both ends with a microUSB plug
- Connects the NRG controller to the RG..N solid state relay and respective RG..N solid state relays

Description

The **RCRGN** cables are proprietary cables that must be used with the NRG system for the internal BUS. These cables connect the NRG controller to the RG..N solid state relays and respective RG..N solid state relays.

The RCRGN... are 5-way cables carrying the communication, supply and autoconfiguration / auto-addressing lines. By means of autoconfiguration / auto-addressing, the RG..Ns are assigned a unique ID based on the physical location and on the internal BUS.

Carlo Gavazzi compatible components

Description	Component code	Notes
NRG Controller	NRGC	 NRGC: NRG controller with Modbus communication. NRGC-PN: NRG controller with PROFINET communication. 1x RGN-TERMRES is included in the NRGC packaging. The RGN-TERMRES is to be mounted on the last RGN on the bus chain.
Solid state relays	RGN	NRG solid state relays



Order code

RCRGN - 🗖 - 2

Enter the code entering the corresponding option instead of lacksquare

Code Option Description **Notes** R Cables С R G Suitable for the NRG system Ν 010 10 cm cable length packed x 4 pcs. 075 75 cm cable length packed x 1 pc. 150 150 cm cable length packed x 1 pc. 350 350 cm cable length packed x 1 pc. 500 500 cm cable length packed x 1 pc. Terminated at the both ends with a microUSB connector 2

RG..CM..N

CARLO GAVAZZI



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RG 1-phase solid state relays with a communications interface

Communication interface for real time monitoring only



Benefits

- **Communications interface.** Solid state relay parameters and diagnostic data are accessible in real time.
- **Reduced maintenance costs and downtime.** Use of real-time data for prevention of machine stoppages during operation.
- **Good quality products and low scrap rates.** Real-time monitoring allows timely decisions for better machine and process management.
- **Reduced efforts in troubleshooting.** Distinguished faults to facilitate and reduce troubleshooting time.
- Versatile. Easy integration in existing machines as the control of the solid state relay does not change compared to a solid state relay without a communication interface.
- Fast installation and set-up. The solid state relays on the BUS are addressed by Auto- addressing for fast setup and prevention of incorrect settings.
- Compact dimensions. Slimline RG series for a minimum product width of 17.8 mm, 1x DIN, up to 37 AAC at 40°C.

Description

The RG..N solid state relays are the switching components in the NRG BUS chain.

Switching of the **RG..D..N** is controlled by a voltage in the range of 4-32 VDC applied to the specific **RG..D..N**. In addition to the typical switching function of a solid state relay, the **RG..N** has integrated monitoring and a communication interface to provide data of the monitored variables and diagnostic information in real-time. The variables that can be read out from each **RG..D..N** are current, voltage, frequency, power, energy consumption and running hours. The status of each **RG..N** is accessible and in case of an unhealthy status, the specific fault is indicated to facilitate troubleshooting.

The **RG..N** cannot interface directly with the system controller (PLC) but needs to be addressed in an **NRG BUS chain** (as explained further on). 1 **NRG BUS chain** can handle up to 48 **RG..D..Ns**. The first **RG..N** in the BUS chain is connected to the NRG controller, whilst the last **RG..N** in the BUS chain has to be terminated with a BUS terminator provided with the NRG controller.

The **RGC..N** has an integrated heatsink and output ratings go up to 660 VAC, 65 A. The **RGS..N** does not have an integrated heatsink. Maximum output ratings of the **RGS..N** go up to 660 VAC, 90 A. LEDs on the front facade give a visual indication of the status of the **RG..N** output, any ongoing communication and the alarm status of the **RG..N** and its respective load.

Specifications are noted at 25°C unless otherwise specified.

Applications

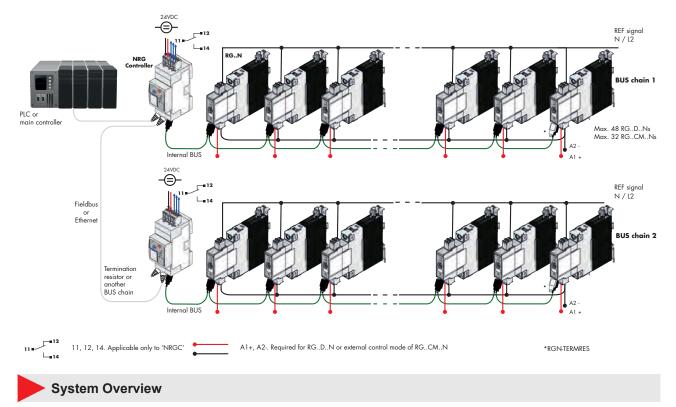
Any heating application where reliable and precise maintenance of temperatures is crucial to the quality of the end product. Typical applications include plastic machinery such as injection machines, extrusion machines and PET blow moulding machines, packaging machinery, sterilisation machinery, drying tunnels and semiconductor manufacturing equipment.



- 1-phase AC zero cross solid state relays up to 660 VAC, 90 AAC
- 4-32 VDC control for switching of the solid state relay
- Communications interface for real-time monitoring



The NRG system



The NRG is a system consisting of one or more BUS chains that enable communication between the field devices (such as the solid state relays) and the control devices (such as the machine controller or PLC).

Each NRG BUS chain consists of the following 3 components:

- the NRG controller
- the NRG solid state relay(s)
- · the NRG internal BUS cables

The **NRG controller** is the interface to the machine controller. It acts as the master of the BUS chain when performing specific actions on the respective BUS chain, and acts as a gateway for the communication between the PLC and the RG..N solid state relays. It is not possible to operate the NRG system without the NRG controller.

The NRG controllers available are:

• NRGC

The **NRGC** is an NRG controller with a Modbus RTU interface over RS485. The NRGC is addressed via the assigned Modbus ID (from 1-247). In an NRG system operating on Modbus it is possible to have 247 NRG BUS chains.

The **NRG solid state relay** is the switching component in the NRG system. Each **RG..N** integrates a communication interface to exchange data with the machine controller (or PLC). The available RG..Ns that can be used in an NRG system are:

• RG. D. N

The RG..D..N are solid state relays for use in an NRG system having the communication interface only for real time monitoring. Control of the RG..N is done via a DC control voltage. It is possible to have maximum 48 **RG..D..Ns** in one NRG BUS chain.

• RG..CM..N

The RG..CM..N are solid state relays for use in an NRG system having the communication interface for control of the **RG..N** through the BUS and for real time monitoring. It is possible to have maximum 32 **RG..CM..Ns** in one NRG BUS chain.

It is not possible to mix RG..D..N and RG..CM..N in the same BUS chain.

The **NRG internal BUS cables** are proprietary cables that connect the NRG controller to the first RG..N in the NRG BUS chain and respective RG..Ns on the BUS. The internal BUS terminator, provided in the same package with the NRG controller, shall be plugged to the last RG..N in the NRG BUS chain.



NRG system required components

Description	Component code	Notes
Solid state relays	RGN	NRG solid state relays
NRG controller	NRGC	NRG controller with Modbus RS485. 1x RGN-TERMRES is included in the NRGC packaging. The RGN-TERMRES is to be mounted on the last RGN on the bus chain.
NRG internal BUS cables	RCRGN-xxx	Proprietary cables terminated at both ends with a micro USB connector



List of contents

RG..D..N

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References

Order code

RG 🗖 1A60D 🗖 🗖 EN

Enter the code entering the corresponding option instead of

Code	Option	Description	Notes	
R		Solid State Relay (RG)		
G		Solid State Relay (RG)		
	С	Version with integrated heatsink		
	S	Version without heatsink		
1		Number of poles		
Α		Switching mode: zero cross		
60		Rated voltage: 600 VAC (42-660 VAC) 50/60 Hz		
D		Control voltage: 4-32 VDC		
	25	Rated current - 25 AAC	For RGConly	
	32	Rated current - 30 AAC, 37 AAC	For RGConly	
	42	Rated current - 43 AAC	For RGConly	
	62	Rated current - 65 AAC	For RGConly	
	50	Rated current - 50 AAC	For RGSonly	
	92	Rated current - 90 AAC	For RGSonly	
	K	Screw connection for power terminals		
	G	Box clamp connection for power terminals		
E		Connection configuration		
Ν		For integration within an NRG system		

Selection guide - versions with integrated heatsink (RGC)

			Rated operational current @ 40°C				
Rated	ated Control Connection	25 AAC	30 AAC	37 AAC	43 AAC	65 AAC	
voltage	ltage voltage power		Product width				
			17.8 mm	17.8 mm	17.8 mm	35 mm	70 mm
600	4 - 32	Screw	RGC1A60D25KEN	RGC1A60D32KEN	-	-	-
VACrms VDC	VDC	VDC Box clamp	-	-	RGC1A60D32GEN	RGC1A60D42GEN	RGC1A60D62GEN

Selection guide - versions without heatsink (RGS)

			Maximum rated operational current				
Rated			50 AAC	90 AAC	-	-	-
voltage			Product width				
			17.8 mm	17.8 mm		-	-
600	4 - 32	Screw	RGS1A60D50KEN	RGS1A60D92KEN	-	-	-
VACrms	VACrms VDC	Box clamp	-	RGS1A60D92GEN	-	-	-



Description	Component code	Notes
NRG controller	NRGC	NRG controller with Modbus RS485. 1x RGN-TERMRES is included in the NRGC packaging
NRG Internal BUS cables	RCRGN-010-2	10 cm cable terminated at both ends with a microUSB connector. Packed x4 pcs.
	RCRGN-075-2	75 cm cable terminated at both ends with a microUSB connector. Packed x1 pc.
	RCRGN-150-2	150 cm cable terminated at both ends with a microUSB connector. Packed x1 pc.
	RCRGN-350-2	350 cm cable terminated at both ends with a microUSB connector. Packed x1 pc.
	RCRGN-500-2	500 cm cable terminated at both ends with a microUSB connector. Packed x1 pc.
Termination resistor	RGN-TERMRES	Internal BUS chain terminator. 1 pc. is included in the NRGC packaging
Plugs	RGMREF	Spring plug labelled 'Ref'. Packed x10 pcs. 1 pc. included in the RGN packaging
	RGM25	Spring plug labelled 'A1 A2'. Packed x10 pcs. 1 pc. included in the RGN packaging
Heatsinks	RHS	Heatsinks for RGS models

Further reading

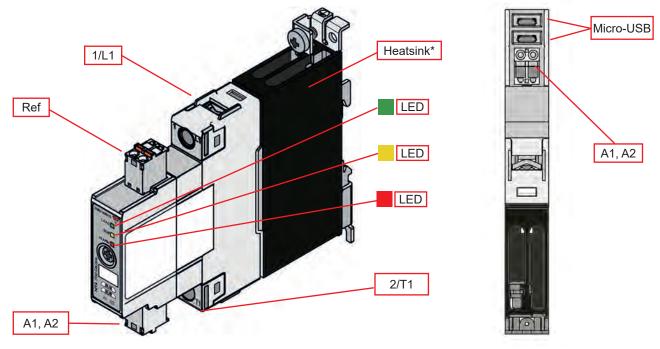
Carlo Gavazzi compatible components

Information	Where to find it	
User manual	http://www.gavazziautomation.com/docs/mt_gh/SSR_UM_NRG.pdf	
Datasheet NRG Controller with Modbus RS485 interface	http://www.gavazziautomation.com/docs/mt_gh/SSR_NRGC.pdf	
Datasheet RGDN solid state relay with real time monitoring via bus	http://www.gavazziautomation.com/docs/mt_gh/SSR_RG_D_N.pdf	
Online heatsink selector tool for RGS	http://gavazziautomation.com/nsc/HQ/EN/solid_state_relays	



Structure

RGC..D..N



* integrated for RGC..N versions. RGS..N do not have an integrated heatsink

Element	Component	Function
1/L1	Power connection	Mains connection
2/T1	Power connection	Load connection
Ref	Voltage reference	Reference signal (L2 or N) for voltage measurement
Rei	connection	2-pole plug internally shorted to allow for looping
A1, A2	Control connection	2-pole plug for control voltage
Green LED	LOAD indicator	Indicates status of RGN output
Yellow LED	BUS indicator	Indicates ongoing communication
Red LED	ALARM indicator	Indicates presence of an alarm condition
Micro-USB	Micro-USB ports for	Interface for RCRGN cable connection for the internal BUS
WIICI0-03B	internal BUS	communications line
Heatsink	Integrated heatsink	Integrated for RGCN versions
пеасынк		RGSN versions do not have an integrated heatsink

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Features

General data

Material	PA66 (UL94 V0), RAL7035	
Wateria	850°C, 750°C/2s according to GWIT and GWFI requirements of EN 60335-1	
Mounting	DIN rail (for RGC only) or panel	
Touch Protection	IP20	
Overvoltage Category	III, 6 kV (1.2/50 µs) rated impulse withstand voltage	
Isolation	Input to Output: 2500 Vrms	
	Input and Output to heatsink: 4000 Vrms	
	RGS50: approx. 170 g	
	RGS92: approx. 170 g	
Weight	RGC25: approx. 310 g	
, C	RGC32: approx. 310 g	
	RGC42: approx. 520 g	
	RGC62: approx. 1030 g	
Compatibility	NRGC (NRG controller with Modbus RS485 interface)	

Performance

RGS.. Output

	RGS50	RGS92	
Operational voltage range, Ue	42 – 660 VAC		
Switching mode	Zero cross	switching	
Max. operational current: AC-51 rating ¹	50 AAC	90 AAC	
Operational frequency range	50/6	0 Hz	
Blocking voltage	120	О Vp	
Power factor	> 0.9		
Output overvoltage protection	Integrated varistor across L1-T1		
Leakage current @ rated voltage	< 5 mAAC		
Minimum operational current	300 mAAC	500 mAAC	
Maximum transient surge current (I _{тรм}), t=10 ms	600 Ap	1900 Ap	
l²t for fusing (t=10 ms), minimum	1800 A-S		
LED indication - LOAD	Green, ON when control output is ON		
Critical dV/dt (@Tj init = 40°C)	1000	V/µs	

1. Max. rated current with suitable heatsink. Refer to RGS heatsink selection tables.



RGC.. Output

	RGC25	RGC32	RGC42	RGC62	
Operational voltage range, Ue	42 - 660 VAC				
Switching mode		Zero cross	s switching		
Max. operational current: AC-51 rating @ 25°C ²	30 AAC	30 AAC KEN 43 AAC GEN	50 AAC	75 AAC	
Max. operational current: AC-51 rating @ 40°C ²	25 AAC	30 AAC KEN 37 AAC GEN	43 AAC	65 AAC	
Operational frequency range	50/60 Hz				
Blocking voltage	1200 Vp				
Power factor	> 0.9				
Output overvoltage protection	Integrated varistor across L1-T1				
Leakage current @ rated voltage		< 5 n	nAAC		
Minimum operational current	300 mAAC	500 mAAC	500 mAAC	500 mAAC	
Maximum transient surge current (I _{TSM}), t=10 ms	600 Ap	1900 Ap	1900 Ap	1900 Ap	
I ² t for fusing (t=10 ms), minimum	1800 A²s	18000 A ² s	18000 A²s	18000 A ² s	
LED indication - LOAD	Green, ON when output is ON				
Critical dV/dt (@Tj init = 40°C)	1000 V/µs				

2. Refer to RGC current derating curves for current ratings at different surrounding temperatures.

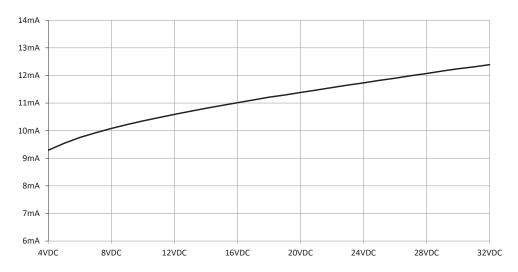
Inputs

Control voltage range, Uc: A1, A2	4-32 VDC
Pick-up voltage	3.8 VDC
Drop-out voltage	1 VDC
Maximum reverse voltage	32 VDC
Maximum response time pick-up	1/2 cycle
Response time drop-out	1/2 cycle
Input current @ 40°C	See diagram below

Note: The output of the SSR is independent of the communications interface, therefore, the control voltage switches ON/OFF the output of the SSR even when this is not connected to the BUS chain (i.e., the RCRGN cable is not connected or a problematic BUS communication line).



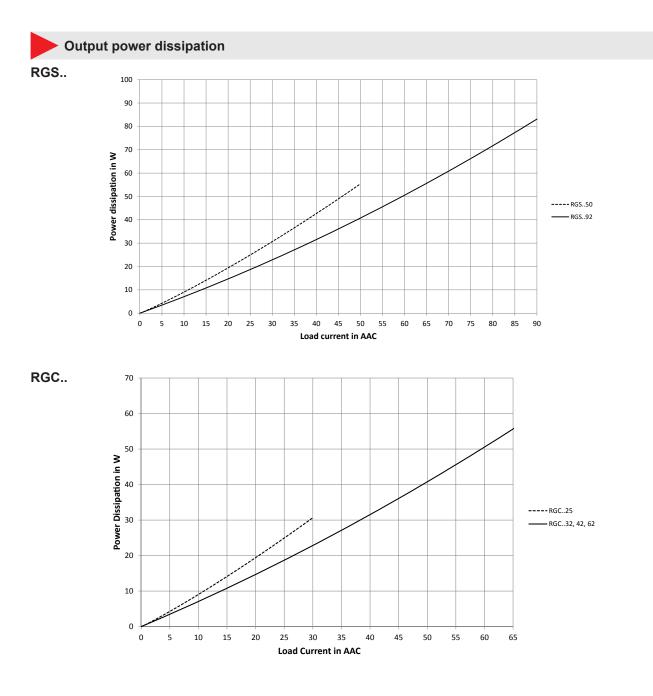
Input current vs. input voltage





Internal bus

Supply voltage	Supplied through 2 wires of the RCRGN bus cable when connected to a powered NRG controller
BUS termination	RGN-TERMRES on last device in the bus chain
Max. no. of RGNs in a bus chain	48
LED indication - BUS	Yellow, ON during ongoing communication
ID for RGNs	Automatic through Auto- addressing (refer to NRG User Manual for further details) Communication is only possible with RGNs that are addressed correctly, i.e., they have a valid ID.



RGS.. Heatsink selection

Thermal resistance [°C/W] of RGS..50

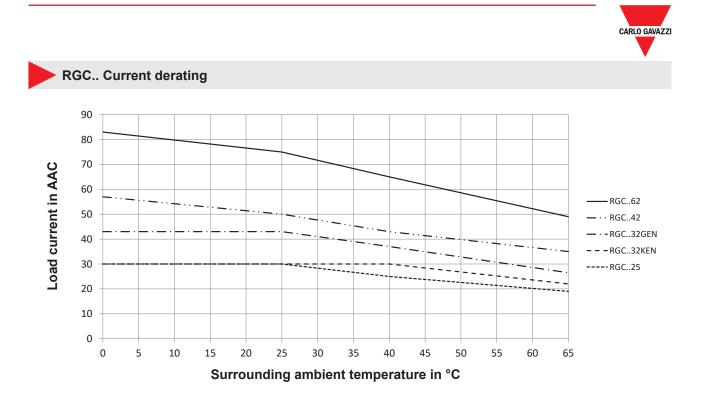
		Surrounding ambient temperature [°C]				
Load current per pole AC-51 [A]	20	30	40	50	60	65
50	1.45	1.28	1.06	0.87	0.68	0.59
45	1.72	1.50	1.29	1.07	0.85	0.75
40	2.00	1.75	1.50	1.25	1.00	0.87
35	2.35	2.06	1.76	1.47	1.18	1.03
30	2.83	2.48	2.13	1.77	1.42	1.24
25	3.52	3.08	2.64	2.20	1.76	1.54
20	4.58	4.01	3.44	2.86	2.29	2.01
15	6.40	5.60	4.80	4.00	3.20	2.80
10	10.19	8.92	7.64	6.37	5.10	4.46
5		19.51	16.72	13.94	11.15	9.76

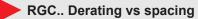
Thermal resistance [°C/W] of RGS..92

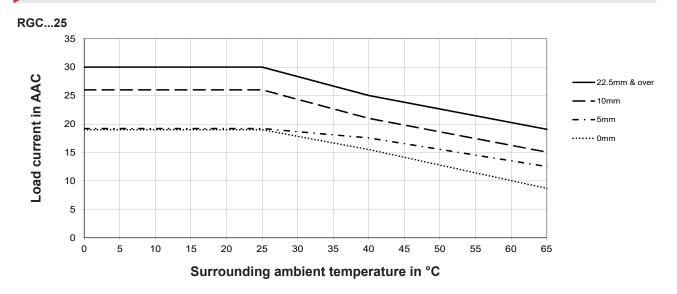
		Surrounding ambient temperature [°C]				
Load current per pole AC-51 [A]	20	30	40	50	60	65
90	0.62	0.52	0.41	0.31	0.21	0.16
81	0.77	0.66	0.54	0.42	0.31	0.25
72	0.97	0.83	0.70	0.56	0.43	0.36
63	1.23	1.07	0.91	0.75	0.59	0.51
54	1.55	1.35	1.16	0.97	0.77	0.68
45	1.93	1.69	1.45	1.21	0.97	0.85
36	2.53	2.21	1.89	1.58	1.26	1.11
27	3.55	3.11	2.66	2.22	1.77	1.55
18	5.67	4.97	4.26	3.55	2.84	2.48
9	12.46	10.90	9.34	7.79	6.23	5.45

RGS.. Thermal data

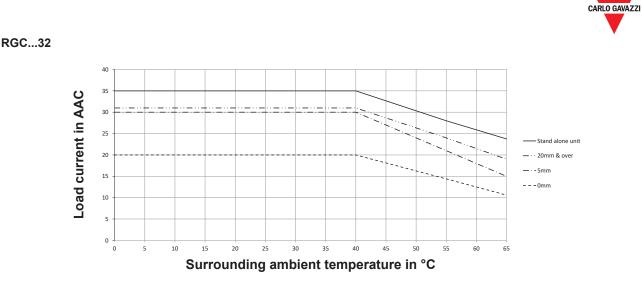
	RGS50 RGS92			
Max. junction temperature	125°C			
Heatsink temperature	100°C			
Junction to case thermal resistance, ${\rm R}_{\rm thjc}$	< 0.30°C/W < 0.20°C/W			
Case to heatsink thermal resistance, R _{thcs}	< 0.25°C/W			



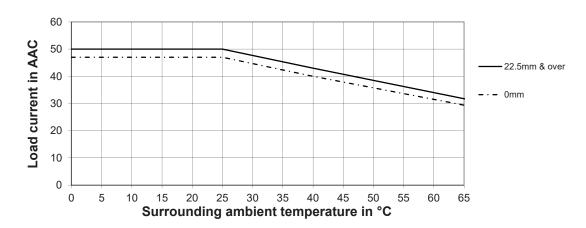




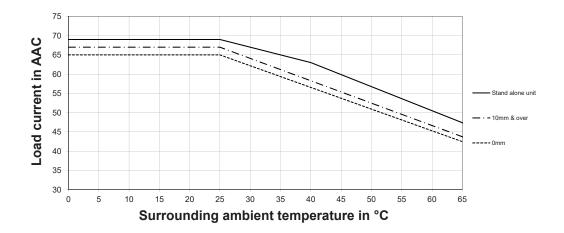
RG...D...N



RGC...42



RGC...62



RG..D..N



Compatibility and conformance

Amprovala	
Approvals	RGS: CE RUIS & EAL
Standards compliance	LVD: EN 60947-4-3 EMCD: EN 60947-4-3 UL: UL508, E172877, NMFT cUL: C22.2 No. 14-13, E172877, NMFT7 UR: UL508, E172877, NMFT2 (for RGSN) cUR: C22.2 No. 14-13, E172877, NMFT8 (for RGSN) CSA: C22.2 No. 14-13, 204075 (for RGSN)
UL short circuit current rating	100 k Arms (refer to short circuit current section, Type 1 – UL508)

Electromagnetic compatibility (E	Electromagnetic compatibility (EMC) - Immunity				
Electrostatic discharge (ESD)	EN/IEC 61000-4-2 8 kV air discharge, 4 kV contact (PC1)				
Radiated radio frequency ³ EN/IEC 61000-4-3 10 V/m, from 80 MHz to 1 GHz (PC1) 10 V/m, from 1.4 to 2 GHz (PC1) 3 V/m, from 2 to 2.7 GHz (PC1)					
Electrical fast transient (burst)	EN/IEC 61000-4-4 Output: 2 kV, 5 kHz & 100 kHz (PC1) Input, BUS: 1 kV, 5 kHz & 100 kHz (PC1)				
Conducted radio frequency ³	EN/IEC 61000-4-6 10 V/m, from 0.15 to 80 MHz (PC1)				
Electrical surge	EN/IEC 61000-4-5 Output, line to line: 1 kV (PC2) Output, line to earth: 2 kV (PC2) BUS (Supply), line to line: 500 V (PC2) BUS (Supply), line to earth: 500 V (PC2) BUS (Data), A1-A2, line to earth: 1 kV (PC2) ⁴				
Voltage dips	EN/IEC 61000-4-11 0% for 0.5, 1 cycle (PC2) 40% for 10 cycles (PC2) 70% for 25 cycles (PC2) 80% for 250 cycles (PC2)				
Voltage interruptions	EN/IEC 61000-4-11 0% for 5000 ms (PC2)				

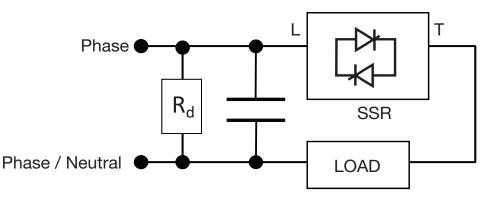
3. Under the influence of RF, a reading error of ± 10% was allowed for load currents > 500 mA and ± 20% for load currents < 500 mA. These tolerances are not maintained if Ref signal is not connected.

4. Not applicable to shielded cables < 10 m. Additional suppression on data lines may be required if shielded cables are not used.

Electromagnetic compatibility (EMC) - Emissions			
Radio interference field emis- sion (radiated)	EN/IEC 55011 Class A: from 30 to 1000 MHz		
Radio interference voltage emissions (conducted)	EN/IEC 55011 Class A: from 0.15 to 30 MHz (External filter may be required - refer to Filtering section)		

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Filter connection diagram



 $R_{d} = 1M\Omega, 0.5W$

Filtering

Part number	Suggested filter for EN 55011 Class A compliance	Maximum heater current [AAC]
RGS50	330 nF / 760 V / X1	30 A
RGS92	220 nF / 760 V / X1	30 A
RGC25	220 nF / 760 V / X1	30 A
RGC32	330 nF / 760 V / X1	40 A
RGC42 , RGC62	330 nF / 760 V / X1	40 A
	680 nF / 760 V / X1	65 A

Note:

- Control input lines must be installed together to maintain products' susceptability to Radio Frequency interference.
- Use of AC solid state relays may, according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where the user must meet E.M.C requirements. The capacitor values given inside the filtering specification tables should be taken only as indications, the filter attenuation will depend on the final application.
- Performance Criteria 1 (PC1): No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2 (PC2): During the test, degradation of performance or partial loss of function is allowed. However when the test is complete the product should return operating as intended by itself.
- Performance Criteria 3 (PC3): Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.



Environmental specifica	lions
Operating temperature	-20 to +65 °C (-4 to +149 °F)
Storage temperature	-20 to +65 °C (-4 to +149 °F)
Relative humidity	95% non-condensing @ 40°C
Pollution degree	2
Installation altitude	0-1000 m. Above 1000 m derate linearly by 1% of FLC per 100 m up to a maximum of 2000 m $$
Vibration resistance	2 g / axis (2-100Hz, IEC60068-2-6, EN 50155)
Impact resistance	15/11 g/ms (EN 50155)
EU RoHS compliant	Yes
China RoHS	25

The declaration in this section is prepared in compliance with People's Republic of China Electronic Industry Standard SJ/ T11364-2014: Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products.

	Toxic or Harardous Substances and Elements				ements	
Part Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominat- ed biphenyls (PBB)	Polybromi- nated diphenyl ethers (PBDE)
Power Unit Assembly	х	0	0	0	0	0

O: Indicates that said hazardous substance contained in homogeneous materials for this part are below the limit requirement of GB/T 26572.

X: Indicates that said hazardous substance contained in one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

这份申明根据中华人民共和国电子工业标准 SJ/T11364-2014:标注在电子电气产品中限定使用的有害物质

Environmental specifications

	有毒或有害物质与元素					
零件名称	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴化联苯 (PBB)	多溴联苯醚 (PBDE)
功率单元	х	0	0	0	0	0
O:此零件所有材料中含有的该有害物低于GB/T 26572的限定。						
X: 此零件某种材	X:此零件某种材料中含有的该有害物高于GB/T 26572的限定。					



Measurements

Parameter	Register reference	Description
Current	CRRDR	This reports the measured load RMS current.
Hold current	CUHDR	This reports the highest RMS value of current recorded over a number of (past) cycles. The number of past cycles is addressable.
Voltage	VRRDR	RMS voltage reading (L1-Ref voltage) that is the supply voltage across the SSR + load (Ref signal connection is required)
Frequency	FQRDR	This reports the measured line frequency.
Apparent power	APRDR	This reports the apparent power that is a multiplication of the voltage RMS value and current RMS value. (Ref signal connection is required)
Real power	RPRDR	This reports the real power reading that is based on the instantaneous voltage & current multiplications. (Ref signal connection is required)
Running hours (On-time)	OTRDR	This is a count of the time during which the SSR output is ON. On switch ON, this register reports the recorded value at the last switch OFF.
Active Energy	ENRDLR, ENRDHR	This reports the energy reading in kWh. On switch ON, this register reports the recorded value at the last switch OFF. (Ref signal connection is required)

Note 1: For further information please refer to the 'NRG user manual'.

Note 2: Ref signal connection is recommended with loads less than 1A

LED indicators

LOAD	Green	The Load LED reflects the status of the load depending on the presence of the control signal. During an over-temperature condition, the LOAD LED will behave according to the indications in the table "LOAD LED indications in over-temperature condition" below		
BUS	Yellow	ON: During a response from the RGN to the NRG controller OFF: Communication between the NRG controller and RGNs is idle or during th transmission of a command from the NRG controller to the RGN		
ALARM	ALARM Red		Fully ON or flashing when alarm condition is present. Refer to Alarm Management section	
		OFF:	No alarm condition	

LOAD LED indications in over-temperature condition

Control signal A1, A2	RGN supply (through internal bus by RCRGN)	Over-temperature condition	LOAD LED green
ON	OFF	Detection not possible without BUS connected	ON
ON	ON	OFF	ON
ON	ON	ON	OFF
OFF	OFF	Detection not possible without BUS connected	OFF
OFF	ON	ON	OFF
OFF	ON	OFF	OFF



Alarm management

Alarm condition present	 The state of the Red LED of the respective RGN is ON with a specific flashing rate Alarm flag (AL1SF), Comms error flag (CMERF) or internal error flag (INERF) in the RGN status register (EDGSR) is set Any of the flags in the Alarm 1 status register (AL1SR) of the respective RGN is set 				
	Please refer to the NRG User Manual for further information				
Alarm types	No. of flashes	Description of fault			
	100% ON	 Over-temperature: The RGN is operating outside its operating range causing the junction to overheat The output of the RGN is switched OFF (irrespective of the control voltage presence) to prevent damage to the RGN The alarm is restored automatically after the cooling-off period 			
	2	Mains loss: Voltage and current signals are absent. The cause is a mains loss (with REF terminal connected)			
	3	Load loss / SSR open circuit: Load is not switching ON when control signal is present. The cause is either a load loss or a RGN open circuit condition			
	4	SSR short circuit: Current flowing through the RGN output in the absence of a control signal			
	5	 Frequency Out of Range: The RGN is operated outside the range set by the Over Frequency and Under Frequency Limit registers (OFLMR and UFLMR). Default range is 44 – 66 Hz The RGN will not stop operating if the frequency measured is out of the set range. The alarm is restored automatically when the frequency is back within the expected range 			
	6	 Current Out of Range: The RGN is operated outside the range set by the Over Current and Under Current Limit registers (OCLMR and UCLMR). Default range is 0 – max. rating of the respective RGN The RGN will not stop operating if the current measured is out of the set range. The alarm is restored automatically when the current is back within the expected range 			
	7	 Voltage Out of Range: The RGN is operated outside the range set by the Over Voltage and Under Voltage Limit registers (OVLMR and UVLMR). Default range is 0 - 660 V The RGN will not stop operating if the voltage measured is out of the set range. The alarm is restored automatically when the voltage is back within the expected range 			
	8	Communication error (BUS): An error in the communication link (internal bus) between the NRGC and RGNs			
	9	Internal error: Bus supply out of range, hardware damage or detection of abnormal conditions			
Flashing rate	0.5s	$ \xrightarrow{3s} $			



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Short circuit protection

Protection Co-ordination, Type 1 vs Type 2:

Type 1 protection implies that after a short circuit, the device under test will no longer be in a functioning state. In Type 2 co-ordination the device under test will still be functional after the short circuit. In both cases, however the short circuit has to be interrupted. The fuse between enclosure and supply shall not open. The door or cover of the enclosure shall not be blown open. There shall be no damage to conductors or terminals and the conductors shall not separate from terminals. there shall be no breakage or cracking of insulating bases to the extent that the integrity of the mounting of live parts is impaired. Discharge of parts or any risk of fire shall not occur.

The product variants listed in the table hereunder are suitable for use on a circuit capable of delivering not more than 100,000A rms Symmetrical Amperes, 600 Volts maximum when protected by fuses. Tests at 100,000A were performed with Class J fuses, fast acting; please refer to the table below for maximum allowed ampere rating of the fuse. Use fuses only.

Tests with Class J fuses are representative of Class CC fuses.

Protection co-ordination Type 1 according to UL 508					
Part No. Prospective short circuit current [kArms]		Max fuse size [A]	Class	Voltage [VAC]	
RGS50, RGC25	100	30	J or CC	max. 600	
RGS92, RGC32, RGC42, RGC62	100	80	J	max. 600	

Protection co-ordination Type 2 with semiconductor fuses						
Part	Prospective	Mersen (Ferraz Shawmut)		Siba		Voltage [VAC]
number short circuit current [kArms]		Max fuse Part number size [A]		Max fuse size [A]	Part number	
RGC25	10	40	6.9xx CP GRC 22x58 /40	32	50 142 06.32	max. 600
	100	40	6.9xx CP GRC 22x58 /40	32	50 142 06.32	max. 600
RGC32	10	63	6.9xx CP URC 14x51 /63	80	50 194 20.80	max. 600
RGC42	10	70	A70QS70-4	80	50 194 20.80	max. 600
	100	63	6.9xx CP URC 14x51 /63	80	50 194 20.80	max. 600
	100	70	A70QS70-4	80	50 194 20.80	max. 600
RGC62	10	100	6.9xx CP GRC 22x58 /100	100	50 194 20.100	max. 600
	10	100	A70QS100-4	100	50 194 20.100	max. 600
	100	100	6.621 CP URGD 27x60 /100	100	50 194 20.100	max. 600
	100	100	A70QS100-4	100	50 194 20.100	max. 600
RGS50	10	80	6.621 CP URQ 27x60 /80	50	50 142 06.50	max. 660
	10	70	A70QS70-4	50	50 142 06.50	max. 660
	100	80	6.621 CP URQ 27x60 /80	50	50 142 06.50	max. 660
	100	70	A70QS70-4	50	50 142 06.50	max. 660
RGS92	10	125	6.621 CP URD 22x58 /125	125	50 194 20.125	max. 660
	10	125	A70QS125-4	125	50 194 20.125	max. 660
	100	125	6.621 CP URD 22x58 /125	125	50 194 20.125	max. 660
	100	125	A70QS125-4	125	50 194 20.125	max. 660



Protection co-ordination Type 2 with Minature Circuit Breakers (M.C.B.s)						
Solid State Relay type	ABB Model no. for Z - type M. C. B. (rated current)	ABB Model no. for B - type M. C. B. (rated current)	Wire cross sectional area [mm ²]	Minimum length of Cu wire conductor [m]⁵		
RGS50, RGC25 (1800 A ² s)	1-pole S201 - Z10 (10 A)	S201-B4 (4 A)	1.0 1.5 2.5	7.6 11.4 19.0		
	S201 - Z16 (16 A)	S201-B6 (6 A)	1.0 1.5 2.5 4.0	5.2 7.8 13.0 20.8		
	S201 - Z20 (20 A)	S201-B10 (10 A)	1.5 2.5	12.6 21.0		
	S201 - Z25 (25 A)	S201-B13 (13 A)	2.5 4.0	25.0 40.0		
	2-pole S202 - Z25 (25 A)	S202-B13 (13 A)	2.5 4.0	19.0 30.4		
RGS92, RGC32, RGC42, RGC62 (18000 A ² s)	1-pole S201 - Z32 (32 A)	S201-B16 (16 A)	2.5 4.0 6.0	3.0 4.8 7.2		
	S201 - Z50 (50 A)	S201-B25 (25 A)	4.0 6.0 10.0 16.0	4.8 7.2 12.0 19.2		
	S201 - Z63 (63 A)	S201-B32 (32 A)	6.0 10.0 16.0	7.2 12.0 19.2		

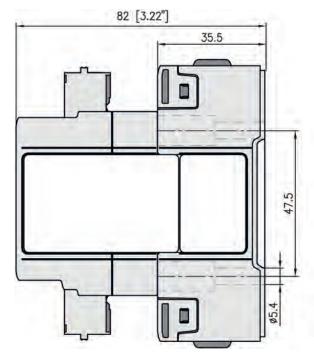
5. Between MCB and Load (including return path which goes back to the mains)

Note: A prospective current of 6 kA and a 230 / 400 V power supply is assumed for the above suggested specifications. For cables with different cross section than those mentioned above please consult Carlo Gavazzi's Technical Support Group.

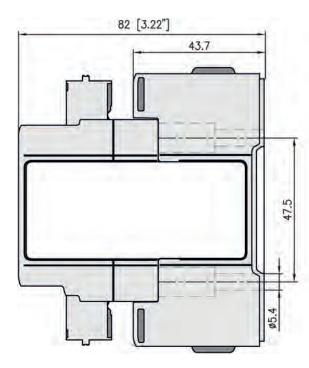


Dimensions

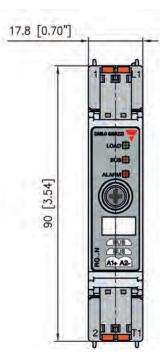
RGS...KEN

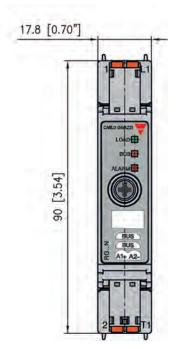


RGS...GEN



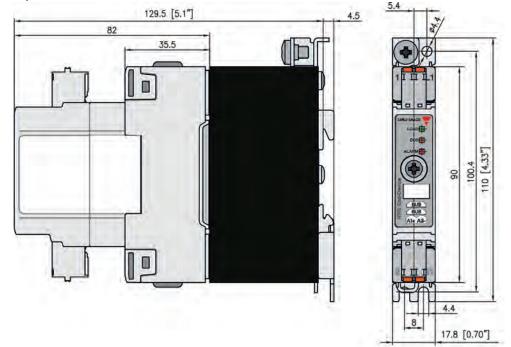
Housing width tolerance +0.5mm, -0mm as per DIN 43880. All other tolerances +/- 0.5mm. Dimensions in mm.



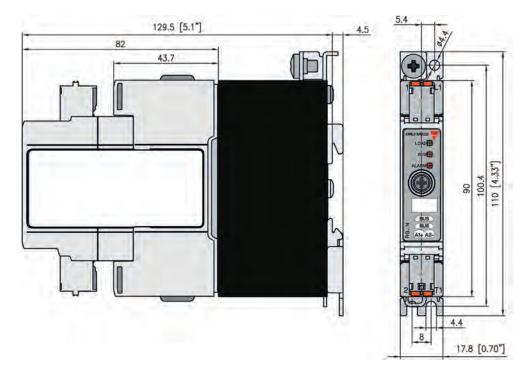




RGC...25KEN, RGC...32KEN



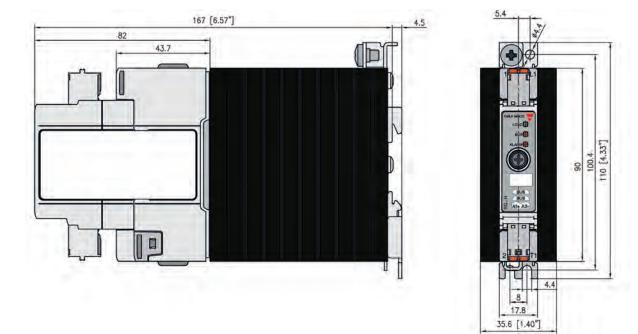
RGC...32GEN



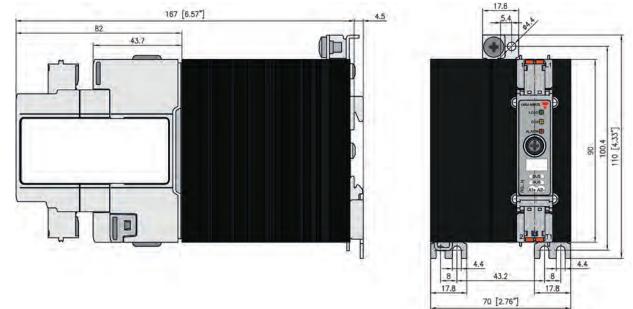
Housing width tolerance +0.5mm, -0mm as per DIN 43880. All other tolerances +/- 0.5mm. Dimensions in mm.



RGC...42GEN



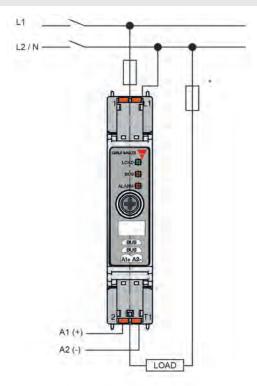
RGC...62GEN



Housing width tolerance +0.5mm, -0mm as per DIN 43880. All other tolerances +/- 0.5mm. Dimensions in mm.

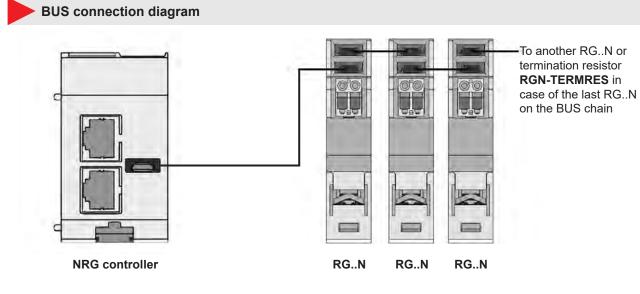




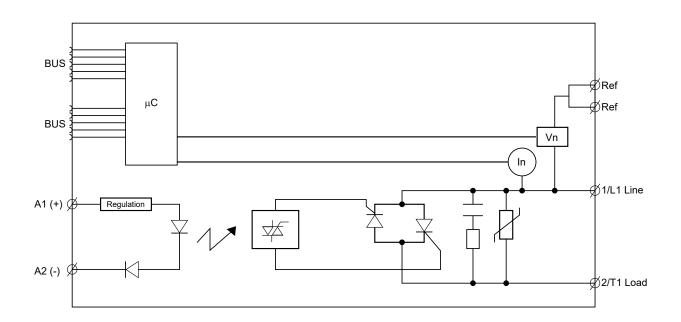


*depends on system requirements

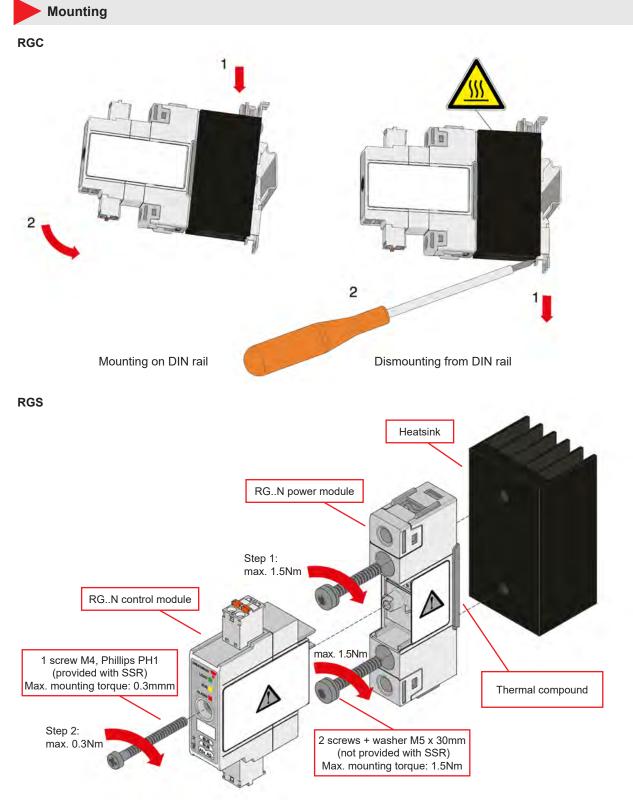




Functional diagram



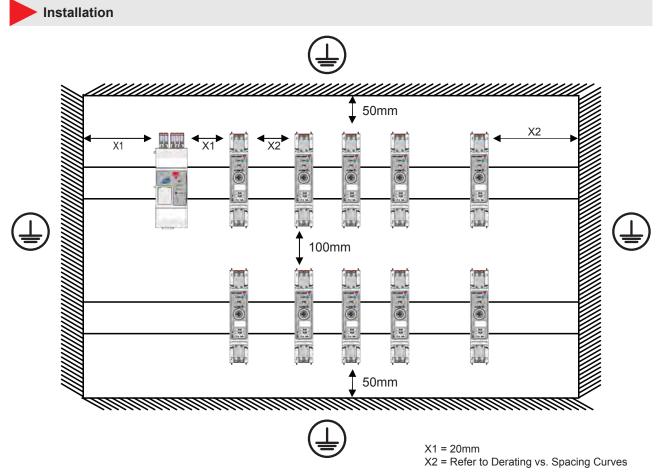




Step 1: Mount RG..N power module to Heatsink Step 2: Mount RG..N control module on RG..N power module

Make sure that the date code (Mxxxxxxxxxx) marked on the side labelling of the 2 modules (i.e., the power module and control module) matches before mounting







Connection specifications

Power connection					
Terminal	1/L1, 2/T1				
Conductors	Use 75°C copper (Cu) conductors				
	RGKEN		RGGEN		
Stripping length	12 mm		11 mm		
Connection type	M4 screw with captivated washer		M5 screw with box clamp		
Rigid (solid & stranded) UL/CSA rated data	2x 2.5 - 6.0 mm² 1x 2.5 - 6.0 mm² 2x 14 - 10 AWG 1x 14 - 10 AWG		1x 2.5 – 25.0 mm² 1x 14 – 3 AWG		
Flexible with end sleeve	2x 1.0 - 2.5 mm ² 2x 2.5 - 4.0 mm ² 2x 18 - 14 AWG 2x 14 - 12 AWG		1x 2.5 – 16.0 mm² 1x 14 – 6 AWG		
Flexible without end sleeve	2x 1.0 - 2.5 mm ² 2x 2.5 - 6.0 mm ² 2x 18 - 14 AWG 2x 14 - 10 AWG 2x 14 - 10 AWG		1x 4.0 – 25.0 mm² 1x 12 –3 AWG		
Torque specifications	Posidrive bit 2 UL: 2.0 Nm (17.7 lb-in) IEC: 1.5 – 2.0 Nm (13.3 – 17.7 lb-in)		Posidrive bit 2 UL: 2.5 Nm (22 lb-in) IEC: 2.5 – 3.0 Nm (22 – 26.6 lb-in)		
Aperture for termination lug (fork or ring)	12.3 mm		n/a		
Protective Earth (PE) connection	M5, 1.5 Nm (13.3 lb-in) M5 PE screw is not provided with the solid state relay. PE connection is required when product is intended to be used in Class 1 applications according to EN/IEC 61140				



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Control & Ref connection			
Terminals	Ref (x2 poles internally shorted on RGN) A1+, A2-		
Conductors	Use 60/75°C copper (Cu) conductors		
Stripping length	11 – 12 mm		
Connection type	Spring plug, pitch 5.08 mm		
Rigid (solid & stranded) UL/CSA rated data	0.2 – 2.5 mm², 26 – 12 AWG		
Flexible with end sleeve	0.25 – 2.5 mm ²		
Flexible without end sleeve	0.25 – 2.5 mm ²		
Flexible with end sleeve using TWIN ferrules	0.5 – 1.0 mm ²		
Ref internal short current handling capability	< 2 AAC		

BUS connection	BUS connection			
	BUS (x2)			
Terminal	BUS BUS A1 A2 Bottom view			
Туре	view RCRGN-xxx (where xxx refers to the length in cm) 5-way terminated with micro USB connector Cable lengths available: 10cm RCRGN-010-2 75cm RCRGN-075-2 150cm RCRGN-150-2 350cm RCRGN-350-2 500cm RCRGN-500-2			
Conductors	+24 V, GND, Data, Data, Auto- addressing line			

RCRGN..



NRG internal BUS cable



Main features

- Cables available at various lengths to provide the internal BUS of the NRG system
- Cables terminated at both ends with a microUSB plug
- Connects the NRGC to the RG..N solid state relay and respective RG..N solid state relays



Description

The **RCRGN** cables are proprietary cables that must be used with the NRG system for the internal BUS. These cables connect the NRG controller to the RG..N solid state relays and respective RG..N solid state relays.

The RCRGN... are 5-way cables carrying the communication, supply and auto- addressing lines. By means of autoaddressing, the RG..Ns are assigned a unique ID based on the physical location and hence internal BUS wiring sequence when an auto- addressing command is sent to the RG..Ns.

Carlo Gavazzi compatible components

Description	Component code	Notes
NRG controller	NRGC	NRG controller with Modbus RS485. 1x RGN-TERMRES is included in the NRGC packaging. The RGN-TERMRES is to be mounted on the last RGN on the bus chain.
Relays	RGN	NRG solid state relays



Order code

RCRGN - - 2

Enter the code entering the corresponding option instead of lacksquare

Code Option Description **Notes** R Cables С R G Suitable for the NRG system Ν 010 10 cm cable length packed x 4 pcs. 075 75 cm cable length packed x 1 pc. 150 150 cm cable length packed x 1 pc. 350 350 cm cable length packed x 1 pc. 500 cm cable length packed x 1 pc. 500 Terminated at the both ends with a microUSB connector 2



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